Can we encourage the devotion of nurses?

An experimental investigation of the effects of various incentives

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Abstract

The existence and the role of social preferences in influencing individual decisions have been widely described. Research has also underlined how critical it is to take into account social preferences when designing incentives to influence individual choices. Social preferences are potentially very relevant to the analysis of decisions made by health care workers. Governments in developed and developing countries have tried to create incentives to shape health workers' behaviours in various areas, and in particular to encourage them to take up posts in under-served areas. We designed a within-subject lab experiment to test the impact of various incentives designed to encourage decisions that benefit patients and are costly to health workers. We played the experiment with 1,064 nursing students: 377 from South Africa; 342 from Kenya; and 345 from Thailand. Each participant in our experiment had to make a series of allocation decisions which differed in the distribution of payoffs between themselves and a patient, in five different treatments. The design of treatments was guided by considering their relevance to potential regulations that could be enforced to alter job choices made by nurses, and their relevance to contextual factors that are more likely to affect nurses' choices. The results showed a large variation in the extent to which the four types of incentives could encourage the devotion of nursing students, in their willingness to accept a reduction in their benefits to yield greater welfare for patients. The prospect of delayed rewards was only effective in Thailand, but even there it was much less persuasive than incentives that used information, either to convey indirectly the deservingness of patients, or to encourage generosity through indirect peer-pressure. Interestingly, an arbitrarily unfair environment where some participants were offered less favourable benefits than the others had the cumulative effect of crowding out the altruistic motives of the victims of the unfair decisions, as well as the others. These findings provide interesting elements for policy-makers to design measures to increase the devotion of nurses, and caution them to avoid creating an institutional environment that could be perceived as unfair.

1. Introduction

There is a substantial body of experimental studies demonstrating that individuals sometimes behave in a manner inconsistent with the maximization of their own monetary rewards, when this would affect the welfare of others. For instance, in public good games, participants contribute more than self-maximization would predict (Ledyard, 1995) and in dictator games a large proportion of participants freely choose to allocate some of their money to anonymous recipients, while no mechanisms incite them to act as such (Camerer, 2003). The existence of such altruism or social preferences is potentially critical to the design of interventions to influence individual choices (Fehr and Fischbacher, 2002). Indeed, since Titmuss (1970) suggested that introducing payment for blood donation could reduce voluntary contribution, a number of studies have demonstrated that incentive mechanisms may be ineffective when they are not compatible with social preferences and intrinsic motivation (Frey, 1997, Frey and Jegen, 2001, Ryan and Deci, 2000).

Social preferences are potentially very relevant to the analysis of decisions made by health care workers. Beyond the long tradition in health economics theory to acknowledge the existence of altruistic motives amongst health care professionals (McGuire, 2000, Ma, 2007, Delfgaauw, 2007, Arrow, 1963), there is empirical evidence describing the altruistic motives of individuals who choose to embrace a health to "help others" (Prater and McEwen, 2006, Miers et al., 2007, Mkhize and Nzimande, 2007). In this context, it is important to reflect on some anecdotal evidence suggesting that some health workers might be less likely to be influenced by, or interested in, monetary incentives (Kingma, 2003, Miers et al., 2007). Investigating social preferences with respect to health personnel may provide new insights for policy-makers who are trying to nudge some of their behaviours or, more even career decisions. Indeed, many governments face the challenge of a maldistributed health workforce, where too many work in affluent urban areas and too few in rural or disadvantaged parts of the territory (Dussault and Franceschini, 2006, Zurn et al., 2004, WHO, 2006). To date, most strategies have used financial incentives and the (limited) evaluations of these strategies show mixed results in developing countries (Chopra et al., 2006, Grobler et al., 2009, Sempowski, 2004). These issues are particularly relevant in developing countries where scarce public resources are allocated to the training of health workers, who soon leave the public sector or are reluctant to work in areas where they are needed the most (Zurn et al., 2004, Dussault and Franceschini, 2006). Designing efficient incentives to alter workers' choices and behaviours requires a better understanding of the nature and determinants of social preferences that can contribute to shape their labour supply decisions.

In this paper, we report results from an experiment designed to test the potential impact of various incentives to modify nurses' propensity to put the benefits of patients before their own in three developing countries. We played several rounds of a framed allocation game with final year nursing students from three countries struggling to attract health care workers to rural areas: Kenya, South Africa and Thailand. In the game, each respondent had to make a series of ten pair-wise allocation decisions under five different environments, or

treatments. Each allocation decision asked respondents to choose between Option A, a certain division of money between themselves and a patient, and Option B, a more favourable allocation of the money for the patient. The first set of ten choice pairs was used to establish a baseline of respondents' social preferences, while the subsequent four treatments represented attempts to duplicate certain incentives or contextual factors that governments might implement in real-life. The idea was to try and understand the extent to which these incentives or contextual factors are likely to influence nurses in devoting themselves more to patients, by sacrificing some of their benefits in order to increase patients' well-being.

The results showed a large variation in the extent to which the four types of incentives can be effective. The promise of a small financial reward in the future did not influence decisions made by Kenyan and South African students, but it was slightly increased the willingness of Thai students to choose an allocation more favourable to patients. A situation where penalties were randomly distributed to participants, akin to compulsory and random assignment of workers to more or less difficult positions, totally backfired and created a strong incentive to choose the more selfish options both amongst those who were punished, but also amongst those who were not. In Kenya this had no effect, in South Africa a negative effect, and in Thailand a positive effect. It also systematically decreased altruistic disposition in those who were randomly allocated to the less favourable situations. Finally, incentives based on information were relatively successful. South African and Kenyan nursing students' preference for more favourable situations for patients was positively associated with the knowledge that this would benefit patients in rural areas, although there was no such evidence in Thailand. Participants from all countries were more generous when they were informed that a majority of their peers had opted for the more altruistic choices.

The rest of the paper is organized as follows. Section 2 details the design and experimental procedures we used. Section 3 reports the results of the study, while the final section discusses the results and concludes.

2. Experimental design and procedures

2.1. A framed allocation game

Each participant in our experiment had to make a series of allocation decisions which differed in the distribution of payoffs between themselves and a patient, in five different treatments. The design of treatments was guided by considering their relevance to potential regulations that could be enforced to alter job choices made by nurses, and their relevance to contextual factors that are more likely to affect nurses' choices. The objective was to determine how these contextual factors or incentives could influence the willingness of participants to sacrifice their own benefits for that of patients.

The first treatment was not meant to provide any particular incentive to choose the allocation decisions more favourable to the patients, but rather to provide a baseline against which one would measure the effects of the four types of incentives.

The second treatment aimed to determine whether nurses are ready to sacrifice part of their benefits to allow certain groups of patients to benefit more. More specifically, in choice A the beneficiary was a patient living in an urban area, while in the other choice (B) where nurses' payoffs were smaller, they were told that the beneficiary was a patient living in a rural area. While not being an incentive per se, this was designed to understand whether nurses consider patients living in under-served areas as more deserving than those who typically benefit from better health care services.

The third treatment reproduced the incentives created by policies that encourage health workers to take up difficult positions in exchange of the prospect of future benefits (e.g. career advancement). In this instance, the influence of a financial bonus received in the future was studied to test whether pro-social choices that affect negatively present well-being can be encouraged by incentives that would bring benefits in the future. In practice, participants were told that if they chose the option that favoured patients more, they would receive an additional bonus within the next two or three months. This could be made possible by the use of payment by mobile phone.

The fourth treatment sought to mimic the framework shaped by human resource measures that authoritatively match health workers to positions, which differ in the benefits enjoyed by the incumbents. For this, penalties, taken off individuals' ultimate payoffs, were randomly distributed to some of the participants. In practice, those who had been allocated an even study number could only gain less than all the others. This institution aimed to test how some inequality of opportunities within a group – whereby some participants will be disadvantaged compared to the rest – can affect the propensity of participants to be generous to others in order to understand the extent to which pro-social preferences are influenced by inequalities of opportunities to earn some benefits.

The fifth, and final, treatment investigated the snow-ball effect that individuals' attitudes and pro-social preferences may have on each other. Here, we study the influence on participants' choices of specific type of social information, defined as the average behaviour of peers in the same situation. The purpose was to find out whether an individual's choice is influenced by information about the behaviour of a larger population in the same situation, testing the existence and strength of social influence on individual preferences. In practice, participants were told, for each of the ten choices in this choice menu, which proportion of other nursing students (from their own country) had chosen the more altruistic option. These percentages had been fabricated by experimenters to convey a sense of peer pressure towards the more generous choices.

2.2. Defining the menu of allocation decisions

Adopting a similar approach to Brandts et al. (2006), we asked participants to make a series of ten allocation decisions. Each binary choice placed respondents in a dictator-like situation where they had to choose between

two allocation situations (named Option A and Option B), which differed in the distribution of payoffs between themselves and a patient. To make the task easier for respondents, the payoffs in Option A remained fixed throughout all questions, while Option B varied each time. Option A was always proposing a higher payoff to the dictator than option B, while the payoff to the patient was systematically higher in option B compared to option A. In other words, throughout the ten choices, the dictator was given the possibility to sacrifice some of her payoffs to help the patient. **Error! Reference source not found.** shows a summary of the alternatives offered to respondents in South Africa. For example in the first choice in South Africa, the dictator had to choose between allocation A and B_1, or whether to give up R25 (down from R100) to increase the patient's benefit by R15.

The design of the choice menu was guided by the need to control for various elements identified in the literature as important determinants of distributional preferences: the payoff to the dictator obviously, the difference between the dictator and recipient's payoffs, and the relative position of the dictator (whether or not the dictator's payoff is greater than that of the recipient).

Table 1: Menu of choices (South Africa)

	Payoff to dictator	Payoff to recipient	Dominant?	Difference
Option A	R100	R50	Yes	50
Option B_1	R75	R65	Yes	10
Option B_2	R85	R85	No	0
Option B_3	R75	R85	No	10
Option B_4	R85	R65	Yes	20
Option B_5	R50	R100	No	50
Option B_6	R75	R75	No	0
Option B_7	R65	R85	No	20
Option B_8	R65	R65	No	0
Option B_9	R65	R75	No	10
Option B_{10}	R85	R75	Yes	10

Note: In Thailand and Kenya the corresponding menus can be obtained by doubling each payoff.

2.3. Experimental procedures

The experiment was played in three countries (South Africa, Thailand and Kenya) with final year nursing students. A total of 1,064 nursing students took part in the experiment: 377 from eight different study sites in South Africa; 342 from three different nursing training institutions in Kenya; 345 nursing students from four different nursing colleges in Thailand. This data collection spanned from April 2007 to July 2008.

Technically, the experiment consisted of two parts, which we call treatments: the baseline distributional treatment, and the incentive treatment, involving four response games placing respondents in a different

environment each time. In this paper, we focus on and analyse the decisions respondents made in the second treatment, designed to test the responsiveness of their social preferences to different types of incentives.

On the day of the study, all participants were gathered in one classroom in each of the data collection sites. Each participant was allocated a study number according to where they seated. Instructions were read out by the experimenter, who followed a detailed script (see Appendix A). In order to ensure anonymity between study participants, they were asked to sit at pre-determined desks separated from each other with enough space. Subjects were allowed to raise their hands to ask questions during the instructions phase and afterward, and were informed that they would be answered privately.

Because the tools were developed to be used in three different countries and two languages (English and Thai), an effort was made to phrase instructions in plain English avoiding abstract or technical terms (Roth et al., 1991). Instructions were also phrased as neutrally as possible, avoiding particularly the words 'experiment' or 'game' which have been shown to generate behavioural biases towards purely selfish choices (Frohlich et al., 2001).

The choice menu was given to all participants in an envelope that contained a decision sheet (see Appendix B). Each dictator had to record their allocation decision (option A or B) for each of the ten decisions by ticking the appropriate box on the response sheet (See Appendix B). To limit ordering effects, four different versions of the choice menus were developed and randomly distributed to respondents. The response sheet of each treatment was collected before respondents were distributed the response sheet corresponding to the next treatment.

Adopting a similar approach to Goeree, McConnell et al. (forthcoming), participants made all allocation decisions, but only one was actually chosen (randomly) to be paid[1]. Participants were told that although their responses were recorded for a multitude of choices, only one of them would be paid, as determined by a random drawing at the end of the experiment.

3. Results

We first present an overview of the results based on aggregate data. We then proceed to the results of the statistical analysis of the impact of the different types of incentives mimicked in the experiment.

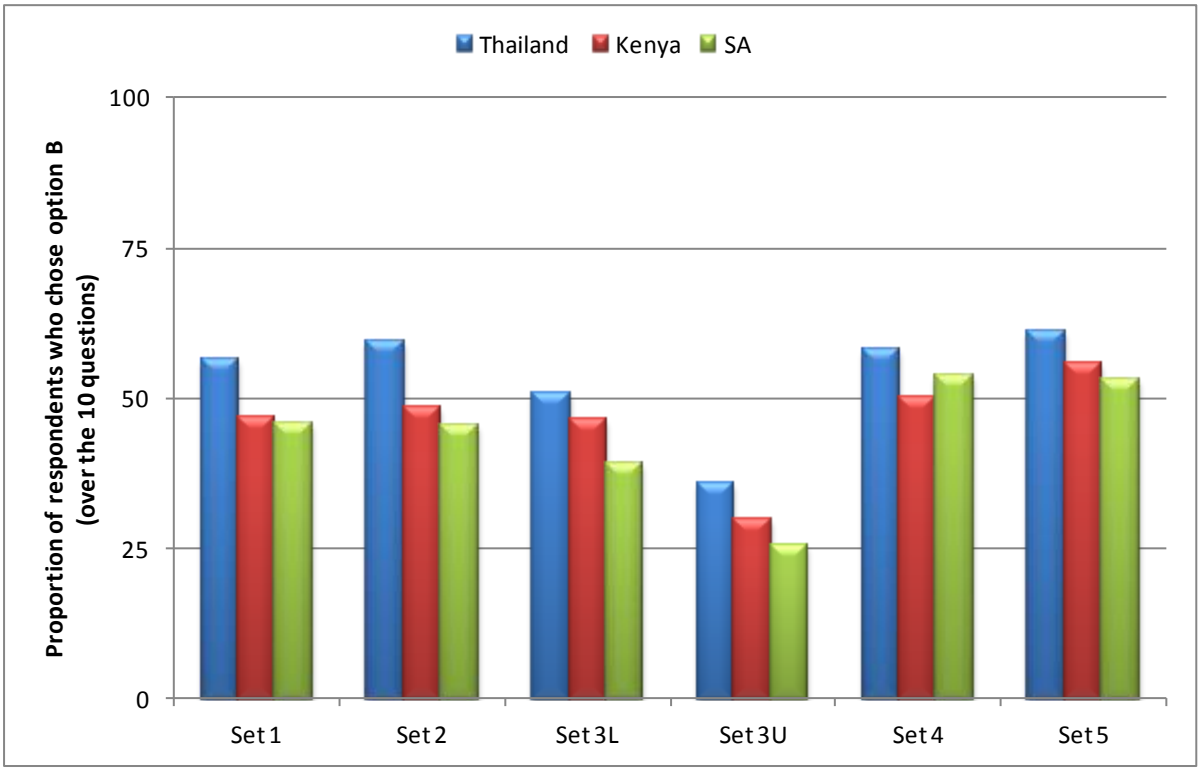
3.1. Aggregate level data

Figure 1 shows aggregate data about the effects of the different incentives across the three countries, as represented by the percentage of individuals who chose Option B over Option A, aggregated over all subjects and all ten binary choices in each treatment. As the figure shows, respondents were, to a large extent, willing to sacrifice some money to increase the patients' benefits. Without any incentive (set 1), there was respectively

[1] This method presents several advantages: it produces several individual measures, minimizes the cost and length of the experimental session, and decreases the risk of contamination that could occur with several games leading to several payoffs.

56.3%, 46.9% and 45.8% of nursing students in Thailand, Kenya and South Africa who chose the less favourable (to them) option B.

Fig. 1: The aggregate impact of incentives



The aggregate data also suggest that all incentives are not effective in encouraging altruistic choices. Interestingly it seems that the final two treatments which only provide additional information, but do not offer additional monetary benefits, are the ones that seem to encourage generosity effectively. On average, 53.9% of respondents across the three countries chose option B in the fourth treatment, and 56.7% in the fifth treatment, against 49.7% in the first baseline treatment. By contrast the delayed reward only increased the proportion of nursing students who chose the more altruistic allocations up to 51.0%.

A quick look at the aggregate results also suggests that the effectiveness of incentives varies across countries. For example, when told that recipients lived in rural areas on average Thai nursing students were not more generous (set 4), while the same information induced a positive effect a amongst Kenyan and South African students (50.2% of Kenyan students and 53.6% of South African students chose option B).

As mentioned earlier, each binary choice implies a different set of factors that are known to influence decisions: the dictator's own payoffs, whether they are in a strong position or not, and the difference in payoffs between themselves and the recipient. Figures 2-4, which show the proportion of respondents who chose Option B for each of the ten questions, and under the five different treatments, highlight how the elements cited above are critical in shaping individuals' behaviours. Typically in the fifth question, where option B requires a very large sacrifice from participants to give a large benefits to patients, there is a significant drop in the proportion of

respondents making the altruistic choice, in all countries and across all treatments. Besides, it appears that the sensitivity of individuals to these different factors is different in different countries. For example, the variations between questions seem more marked in South Africa compared to Thailand.

Overall, this heterogeneity in decisions underscores the importance of controlling for the different factors at the same time to isolate the effects of the incentives.

Fig. 2: Heterogeneity of decisions made by South African nurses over the choice menu

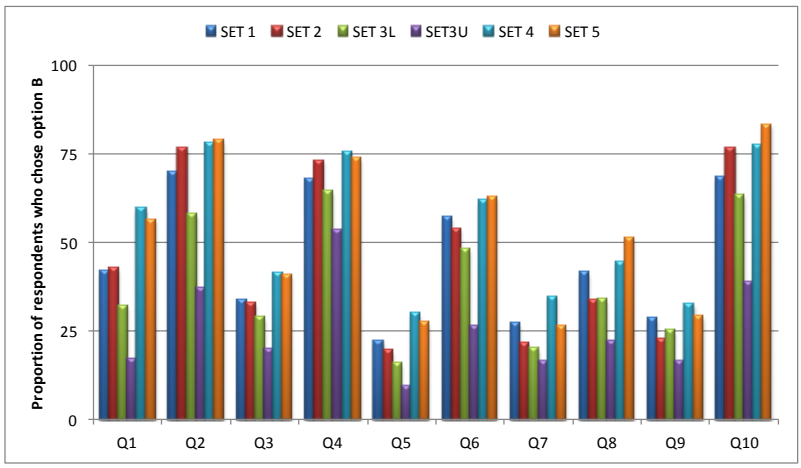


Figure 3: Heterogeneity of decisions made by Thai nurses over the choice menu

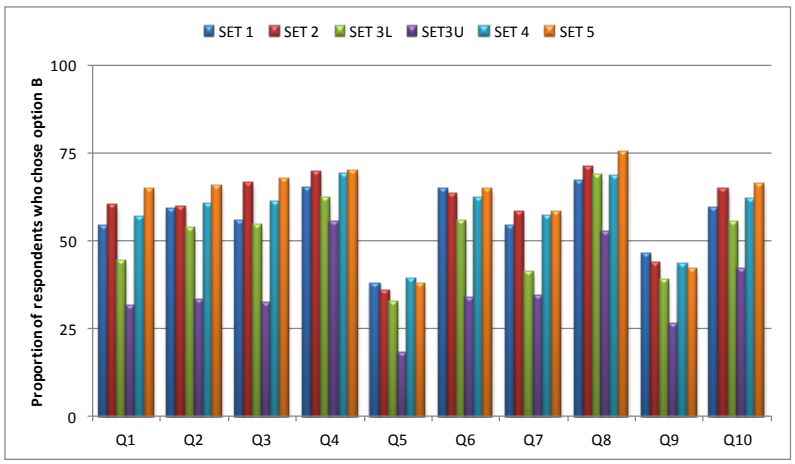
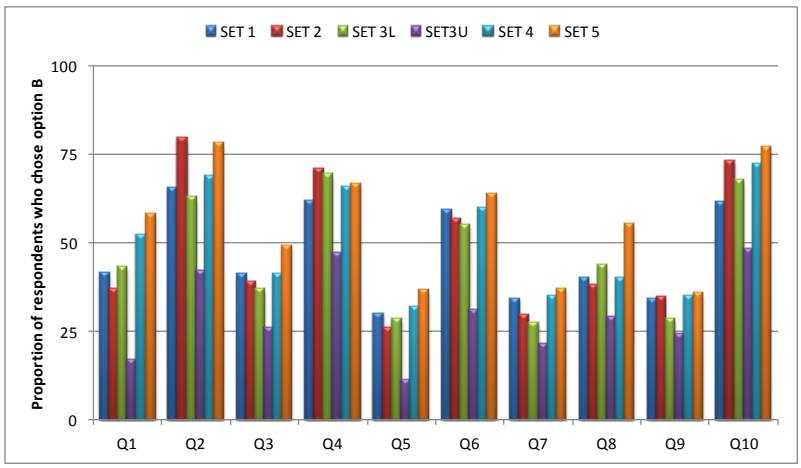


Fig. 4: Heterogeneity of decisions made by Kenyan nurses over the choice menu



3.2. Analysis of individual decisions

The statistical analysis presented here consists of a series of random effects probit regressions to compare decisions across blocks and control for individual correlations of sequential choices. We estimated models taking into account the four experimental treatments at the same time, so that the coefficients of indicator variables for each treatment specify the significance and strength of effects. For each country, we estimated the following model:

$$d_{it} = \beta_0 + \beta_1 \text{DELAY} + \beta_2 \text{LUCKY} + \beta_3 \text{UNLUCKY} + \beta_4 \text{RURAL} + \beta_5 \text{PEER} + \beta_6 \text{ZA} + \beta_7 \text{KN} + \beta_8 \textit{SELF} + \beta_9 \textit{STRONG} + \beta_{10} \textit{DIFF} + \mu_{it}$$

where the endogenous variable d_{it} is the decision of subject i in round t (for t=1, ..50)[2]; DELAY is a dummy variable that takes the value 1 for the second treatment (where respondents are offered a differed incentive if they choose option B); LUCKY and UNLUCKY are dummy variables for the third treatment respectively if respondents had an arbitrary advantage (with an odd study number) or disadvantage (with an even study number); RURAL is a dummy variable for the fourth treatment where respondents are told that the recipients are in rural areas; PEER is a dummy variable for the fifth treatment where individuals are told that a majority of their peers chose the altruistic option. Finally SELF, STRONG and DIFF capture the three characteristics of the binary choice offered.

Table 2: The effects of incentives encouraging pro-social behaviours

	Thailand		Kenya		South Africa	
Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
CONSTANT	0.853***	1.012	0.563***	0.274	0.782***	0.519*
	(0.057)	(1.180)	(0.065)	(0.190)	(0.066)	(0.216)
DELAY	0.090**	0.090**	0.054	0.055	-0.019	-0.019
	(0.033)	(0.033)	(0.034)	(0.034)	(0.034)	(0.034)
UNLUCKY	-0.647***	-0.648***	-0.258***	-0.254***	-0.255***	-0.254***
	(0.046)	(0.046)	(0.049)	(0.049)	(0.049)	(0.049)
LUCKY	-0.161***	-0.161***	-0.072*	-0.072*	-0.244***	-0.244***
	(0.042)	(0.042)	(0.043)	(0.043)	(0.043)	(0.043)
RURAL	0.046	0.046	0.106**	0.105**	0.271***	0.271***
	(0.033)	(0.033)	(0.034)	(0.034)	(0.034)	(0.034)
PEER	0.154***	0.154***	0.298***	0.299***	0.269***	0.269***
	(0.033)	(0.033)	(0.034)	(0.034)	(0.034)	(0.034)
SELF	0.012***	0.012***	0.024***	0.024***	0.053***	0.053***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
STRONG	0.001	0.001	0.556***	0.556***	0.807***	0.807***
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
DIFF	0.001	0.001	-0.008***	-0.008***	-0.015***	-0.015***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
AGE		-0.003		0.007		0.006
		(0.053)		(0.006)		(0.006)
MALE		-0.265		0.033		-0.315*
		(0.177)		(0.108)		(0.134)
CAPITAL		-0.341***		0.142		0.229*
		(0.087)		(0.097)		(0.095)
Nb of observations	17,100	17,100	17,250	17,250	18,850	18,850
Log-likelihood	-10044	-10035	-9393	-9357	-9386	-9379
Prob>Chi2	0.000	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses ; *** p<0.001, ** p<0.01, * p<0.1

[2] Study participants made ten choices in each of the five treatments.

The promise of a small financial reward in the future did not influence decisions made by Kenyan and South African students, while for Thai students it did increase the probability that they would choose an option more favourable to patients. In all three countries, those who were randomly assigned to a less favourable situation (because they had an even study number) were less inclined to sacrifice themselves even more for a greater benefit to patients. Interestingly, in all countries the participants who were fortunate not to be 'punished' (because they had been given an odd study number) were also less inclined to sacrifice part of their payoffs. South African and Kenyan nursing students' preference for more favourable situations for patients was positively associated with the knowledge that this would benefit patients in rural areas, whilst there was no such evidence in Thailand. Finally, in all countries nursing students' altruistic choices were enhanced when they knew that a majority of their peers had made similar choices.

Pooling the data from the three countries then allowed us to formally test the extent to which the responsiveness to incentives (both in its intensity and direction) differed across different groups of individuals. The specification of the basic random-effects probit model we estimated was:

$$d_{it} = \beta_0 + \beta_1 \text{DELAY} + \beta_2 \text{ODD} + \beta_3 \text{EVEN} + \beta_4 \text{RURAL} + \beta_5 \text{PEER} + \beta_6 \text{ZA} + \beta_7 \text{KN} + \beta_8 SELF + \beta_9 STRONG + \beta_{10} DIFF + \mu_{it}$$

where ZA (KN) is a dummy variable that takes the value 1 for respondents from South Africa (Kenya) and zero otherwise. Other specifications included controls for individual characteristics as well as interaction terms between the country dummy variables and the treatment variables. Table 3 reports the results of this analysis.

The results of the pooled analysis presented in Table 3 clearly show difference across countries in the way nursing students reacted to the incentives introduced. The results confirm that the delayed bonus is overall effective, but significantly less so in South Africa compared to Thailand, while there no difference in effect size was found between Kenya and Thailand. The random assignment of individuals to less favourable situations backfired in all countries. Indeed this treatment reduced participants' willingness of sacrificing some of their welfare, whether they were unlucky or lucky in their random assignment. The generosity of Kenyan unlucky students was however less negatively impacted than that of Thai students. Although divulging the rural origin of recipients was found to be a significant motivator overall (Models 1 and 2), the introduction of interaction terms showed that this result was mainly driven by the strong influence of this information in South Africa compared to Thailand, while there was not particular effect in Kenya. Finally, peer pressure had a positive overall impact, with Kenyan participants particularly more sensitive to this lever than their Thai counterparts. In contrast, there was no difference in effectiveness of that incentive between Thailand and South Africa.

Table 3: The differential effects of incentives encouraging pro-social behaviours across countries

Variable	Model (1)	Model (2)	Model (3)	Model (4)
CONSTANT	0.629***	0.508***	0.652***	0.531***
	(0.039)	(0.050)	(0.042)	(0.052)
DELAY	0.038*	0.038*	0.089**	0.089**
	(0.018)	(0.018)	(0.032)	(0.032)
UNLUCKY	-0.312***	-0.312***	-0.359***	-0.359***
	(0.025)	(0.025)	(0.042)	(0.042)
LUCKY	-0.145***	-0.145***	-0.161***	-0.161***
	(0.023)	(0.023)	(0.041)	(0.041)
RURAL	0.128***	0.128***	0.049	0.049
	(0.018)	(0.018)	(0.032)	(0.032)
PEER	0.212***	0.212***	0.151***	0.151***
	(0.019)	(0.019)	(0.033)	(0.033)
SELF	0.020***	0.020***	0.020***	0.020***
	(0.001)	(0.001)	(0.001)	(0.001)
STRONG	0.503***	0.503***	0.504***	0.505***
	(0.018)	(0.018)	(0.018)	(0.018)
DIFF	-0.006***	-0.006***	-0.006***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)
ZA	-0.361***	-0.453***	-0.387***	-0.479***
	(0.023)	(0.029)	(0.036)	(0.040)
KN	-0.134***	-0.209***	-0.179***	-0.254***
	(0.018)	(0.024)	(0.034)	(0.038)
ZA x DELAY			-0.105*	-0.104*
			(0.045)	(0.045)
ZA x UNLUCKY			0.032	0.034
			(0.059)	(0.059)
ZA x LUCKY			-0.058	-0.061
			(0.057)	(0.057)
ZA x RURAL			0.182***	0.182***
			(0.045)	(0.045)
ZA x PEER			0.066	0.067
			(0.045)	(0.045)
KN x DELAY			-0.045	-0.043
			(0.046)	(0.046)
KN x UNLUCKY			0.113*	0.114*
			(0.059)	(0.059)
KN x LUCKY			0.110*	0.113*
			(0.058)	(0.058)
KN x RURAL			0.046	0.044
			(0.046)	(0.046)
KN x PEER			0.116*	0.116*
			(0.046)	(0.046)
AGE		0.005***		0.005***
		(0.001)		(0.001)
MALE		-0.077**		-0.078**
		(0.026)		(0.026)
CAPITAL		0.129***		0.129***
		(0.028)		(0.028)
Number of observations	53,200	53,200	53,200	53,200
Log-likelihood	-31547	-31486	-31512	-31450
Prob>chi2	0.000	0.000	0.000	0.000

Standard errors in parentheses ; *** p<0.001, ** p<0.01, * p<0.1

4. Discussion and conclusion

We did not find evidence that supported the theory that monetary incentives can crowd out intrinsic altruistic motivations (Frey and Jegen, 2001). However the differed monetary reward that was promised to participants if they chose to sacrifice part of their present welfare for a greater benefit to patients was not found an effective incentive in Kenya and South Africa. Even in the case of Thailand where it was found to be effective, the prospect of delayed rewards was much less persuasive than incentives that used information, either to convey indirectly the deservingness of patients, or to encourage generosity through indirect peer-pressure. This finding may be linked to the lack of trust of individuals in the future fulfilment of a present promise. In the context of this experiment a lot was made to ensure that participants trusted the experimenters, who were part of a team of researchers committed to follow respondents over time, and meet again. Alternatively, respondents may have placed little value in future gains, as opposed to present ones. This result suggests that policies offering differed bonuses or career advancement as an incentive for health care workers to accept more difficult positions are likely to fail, either because they are not credible or due to a strong preference for the present.

Despite the lack of evidence proving the effectiveness of financial incentives in encouraging the retention of health workers in the public sector or under-served areas (Grobler et al., 2009, Wilson et al., 2009, Sempowski, 2004, Chaix-Couturier et al., 2000), governments are often tempted to introduce financial incentives, probably because they are simpler and easier to design. However the results here suggest that non-monetary incentives can be stronger than monetary rewards in encouraging health care workers to sacrifice part of their welfare for the benefit of patients. Such finding is particularly encouraging, as non-monetary rewards are likely to be most cost-effective than financial ones. The positive snow-ball effect of knowing that peers have committed to altruistic choices is particularly interesting and governments could build upon that finding and imagine programmes that replicate such incentive. For example, they could promote the positive experiences of those who are ready to contribute to the greater good of under-served communities, at the expense of their own comfort. Thailand is one of the few countries that has introduced a related measure, with the creation of the 'rural doctor of the year' award {Wibulpolprasert, 2003 #362}.

Interestingly, we found that the propensity of nurses to accept a sacrifice to increase the well-being of patients was greatly reduced when they were randomly assigned to a situation where their benefits were reduced (even after controlling for the dictators' payoffs). In other words, in a situation that one can qualify of unfair and that detrimentally affects their well-being, participants decided to behave more selfishly. They were less ready to help patients, even though the latter had nothing to do with their bad luck. Even more captivating, we observed some collateral damage of the existence of these arbitrary sanctions, as those who were *not* sanctioned still changed their behaviours, and decided to be less generous. This crowding-out effect is particularly remarkable, as it suggests that an environment where unfair and arbitrary decisions exist is likely to crowd out altruistic motives, whether or not one is the victim of an unfair treatment.

The results of this experiment also underscore the danger of "one size fits all" recommendations when it comes to designing incentives, as cultural factors might shape decisions. For example, only Thai participants were persuaded by a delayed reward, while Kenyans and South Africans' generous attitudes remained unchanged. Although, we cannot verify this, the greater scepticism of South African and Kenyan participants may be explained by similar societal norms in countries with wide inequalities and less solidarity than is present in Thai society where harmony and trust are recognised as core values (Komin, 1990). Furthermore, the absence of effectiveness of the 'rural' treatment in Thailand compared to the other two African countries, is probably linked to the different meaning and realities conveyed by "rural areas" in these countries. In a complementary survey to this experiment, respondents answered questions relating to their attitudes and beliefs towards life in rural areas. The results confirmed the hypothesis that Kenyan and South African respondents associated hardship with rural areas, while it was not the case in Thailand (Pagaiya, 2010).

It is still unclear to what extent such results from laboratory experiments can be generalised to real-world settings, here in health systems in developing countries. Other researchers have underlined the difficulties to compare laboratory and field behaviours, where different motives can play a role (Levitt and List, 2006). In this specific experiment, there might be concerns that nursing students lack the professional experience and contextual factors to make realistic career decisions, or simply to decide whether they are willing to sacrifice their well-being for patients. However, the main objective of this study was to isolate the possible causal relationship between some policy basic incentives and the propensity of health workers to sacrifice part of their welfare for the benefit of patients, as they might be asked in their professional careers. To this end, the experiment was designed to ensure that all factors potentially influencing decisions. Other than the incentives themselves, would be held constant. The abstraction of the laboratory is therefore an advantage rather than a shortcoming, as study participants did not need to worry about (and were not influenced by) whether there would be equipment to do their job properly, which illness would their patients suffer from, or who these patients would be.

Overall, this experiment and its results underline the various benefits in using laboratory experiment to test the effects of potential incentives. Firstly, with a within-subject design, we were able to test the direction and relative effects of several incentives which mimic those sometimes introduced by policy-makers. Secondly, we compare decisions across treatments and countries under true ceteris paribus conditions as only the policy incentives are changed. The use of a controlled environment, with replicable instructions and protocols, ensures the comparability of the results across countries, which is rarely the case in field experiments where implementation of policy interventions is much more context-dependent. Finally, the cost and logistics of the lab experiments are nothing in comparison to the resources necessary to test the effects of a policy initiative, either in a limited pilot study, or in a randomised field experiment. Researchers should encourage the use of lab experiments as rapid "test-beds" to prepare the design of policy interventions.

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TABLES

FIGURES

APPENDIX A – Instructions to participants

In this activity, you will be asked many times to choose between 2 options, A and B. Each time, we will ask you to divide some money between yourself and a patient. You will never be told who exactly that patient is, either during or after the session, and he or she will not be told who you are. The patient will be different for each of you.

There will be 5 different set of 10 choices. You have now set 1 in your hands and we will later distribute 4 more sets which will be very similar. Each of the 5 sets is slightly different, but the basic design –the series of 10 questions with option A and B- will remain the same. To avoid confusion, we will give you one set at a time.

Look closely at the first set of choices looks like that *(show the first set).* For each of the 10 questions, you have to decide whether you prefer option A or option B. Both options reflect different divisions of money between you and the patient.

You may have the feeling that all the questions are similar but they are not – please pay attention to the details and make your choices according to what matters for you.

The amounts of money are real, and you will earn real money out of it. The money you earn with this activity will be paid to you with the money you earned in activity one. In fact the money for activity one is being put in the envelopes right now.

To simplify our task to calculate your earnings and save a lot of time, like for the first task, we will not pay all the questions, but we will choose randomly one question. It is the response you have given for that particular question chosen randomly that will determine the money you take home after this game.

To make sure that the choice of the question is really random, like for the first activity, one of you will come and draw a paper, on which will be written a question number (*show papers)*.

Example:

We will have the 5 sets of 10 questions, and for every single one you will choose either option A or option B.

After everybody has completed all the choices, we will randomly draw a paper in this box (*show papers*). The paper drawn will determine the money that you take home. Someone will come here and draw one of these papers from a bag: each paper corresponds to a particular question. *(show examples of papers)*.

Imagine that paper "SET 1 QUESTION 4" is drawn. That corresponds to the 1st set, question 4.
It means that it is the decision made for that question that will determine how much people take away for this task.
In that case we will put R75 more in the envelope of player with study number *xxx*. We will also give R85 for the benefit of a patient.

Therefore it is very important that you give the same level of care to each choice, because ANY QUESTION could determine the money allocated to you and to someone else.

- If you have not circled an answer and that it is chosen by the random drawing, you will not get anything.
- If you have not written down your study number we will also be unable to pay what you have gained.

Again, there is no right or wrong answer, the only right answer is what you really want to choose. At the end of each set you will put the sheet on the right of your desk. We will collect them one after the other.

The answers you give for this first set are going to determine your earnings if at the end of the session, the paper that will be drawn says "SET 1 – QUESTION 1" or "SET 1 – QUESTION 2", etc.. So remember that one of these questions (and the answer you choose) could well be the one that will determine how much money you take back home.

We will now distribute the 2nd set of choices. *[Distribute the sheet]*

The answers you give with this set are going to determine your earnings if at the end of the session, the paper that will be drawn says “SET 2 – QUESTION 1” or “SET 2 – QUESTION 2”, etc..

So remember that one of these questions (and the option you choose) could well be the one that will determine how much money you take back home.

This set of choices is very similar to the first one. The only difference is that some options give you the opportunity to get some extra money. Yet that extra money will not be paid to you today, unlike the rest of your earnings. Instead, it will be paid in 2-3 months from now when we will make the first contact with you for the cohort follow-up.

If the “wining question” (the one that will determine your payoffs for this task) is from this set, and that you choose an option where there is the future bonus, than we will take you account number – or your email if you don’t have your account number here with you – and we will send you the extra bonus in one month from now.

We will now distribute the 3rd set of choices. *[Distribute the sheet]*

The answers you give with this set are going to determine your earnings if at the end of the session, the paper that will be drawn says “SET 3 – QUESTION 1” or “SET 3 – QUESTION 2”, etc..

So remember that one of these questions (and the option you choose) could well be the one that will determine how much money you take back home.

With this set of choices, we are going to divide the group here in two. Those of you who have an EVEN Study number, you will be disadvantaged and will in any case get R15 less than those with an even number.

Let me give you an example on how to read your sheet. *[Show sheet on the projector and explain].* Imagine I have the Study number 253. This is an odd number. So with this set of questions, my benefits are indicated after the word “odd” [*show on the sheet*]: I still get R100 for Q1 – option A. Note that the patient payoff remains unchanged.

Imagine now that another person has the Study number is 432 – this is an even number. Her payoffs are indicated after the word “even”: this means that for question 1 – option A, that person doesn’t get 200 Baths –unlike the even person- but she gets R75, R15 less than the payoff of an Odd study number. Note that the patient payoff remains unchanged. [*show on the sheet*].

So check whether you have an odd or even number and then you will know what your choices are for each question.

We will now distribute the 4th set of choices. *[Distribute the sheet]*

The answers you give with this set are going to determine your earnings if at the end of the session, the paper that will be drawn says “SET 4 – QUESTION 1” or “SET 4 – QUESTION 2”, etc..

So remember that one of these questions (and the option you choose) could well be the one that will determine how much money you take back home.

Here you can see that you have been given an extra piece of information on the identity of the person with whom you have to divide the money. You know that in this case the patient is from a rural area. We cannot tell you more than that.

We will now distribute the last and fifth set of choices.

The answers you give with this set are going to determine your earnings if at the end of the session, the paper that will be drawn says “SET 5 – QUESTION 1” or “SET 5 – QUESTION 2”, etc..

So remember that one of these questions (and the option you choose) could well be the one that will determine how much money you take back home.

In this set of choices, we give you some information on the choices made for the first set in another group of nurses in South Africa.

[*Show on the projector*] For example, for the first question given in Q1, we know that 16 % had chosen Option A and that 84% had chosen Option B. And so it continues for other choices.

APPENDIX B – Response sheet (SET1)

STUDY NUMBER:

For each of the 10 questions, choose either Option A or Option B

	Option A	Option B
Q1	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 75 **A patient gets:** **R** 65
You choose:		
Q2	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 85 **A patient gets:** **R** 85
You choose:		
Q3	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 75 **A patient gets:** **R** 85
You choose:		
Q4	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 85 **A patient gets:** **R** 65
You choose:		
Q5	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 50 **A patient gets:** **R** 100
You choose:		
Q6	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 75 **A patient gets:** **R** 75
You choose:		
Q7	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 65 **A patient gets:** **R** 85
You choose:		
Q8	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 65 **A patient gets:** **R** 65
You choose:		
Q9	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 65 **A patient gets:** **R** 75
You choose:		
Q10	**You get:** **R** 100 **A patient gets:** **R** 50	**You get:** **R** 85 **A patient gets:** **R** 75
You choose:		