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Task vs. Mission-Based Motivations in Health Care

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Abstract*

A booming literature has argued that mission-based motives are a central feature of mission-oriented labor markets. This paper shifts the focus to task-based motivation and finds that it yields significantly more effort than mission-based motivation. Moreover, in the presence of significant task motivation, mission motivation has no additional effect on effort. The evidence emerges from experiments with nearly 250 medical and nursing students in Burkina Faso. The students exert effort in three tasks, from boring to interesting. In addition, for half of the students, mission motivation is present: their effort on the task generates benefits for a charity. Two strong results emerge. First, task motivation has an economically important effect on effort. Second, mission motivation increases effort, but only for mundane tasks and not when the task is interesting. Moreover, even for mundane tasks, the effects of mission motivation appear to be less than those of task motivation.

JEL Codes: C91; H83; J45
Keywords: civil service, extrinsic motivation, intrinsic motivation, performance, public sector reform

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Introduction

Organizations make large investments to inspire nonpecuniary motivation. Unfortunately, they make these bets lacking three key pieces of information: which nonpecuniary motivations elicit greater effort, how the nonpecuniary motivations interact, and which employees are most susceptible to them. For example, nonprofit organizations emphasize mission motivation. They base recruitment decisions on mission dedication and spend millions to clarify and broadcast their mission, but do not know how the payoffs to these investments compare to or depend on task motivation.[1] An important body of research has emerged to shed light on these issues (among the more empirical recent contributions, Andersson et al., 2015; Ariely, Bracha, and Meier, 2009; Ashraf, Bandiera, and Jack, 2014; Bandiera, Barankay, and Rasul, 2010; Bradler et al., 2018; Carpenter and Myers, 2010; Tonin and Vlassopoulos, 2014). In this paper, we report results from a novel lab-in-the-field experiment that, for the first time, distinguishes the contributions of two sources of nonpecuniary motivation to effort: the degree to which employees work harder for a mission that they value (mission matching); and the extent to which the nature of the task itself motivates workers to exert extra effort (task motivation). We find that task motivation elicits significantly more effort, although mission motivation has received more attention in the literature. Furthermore, mission motivation contributes little to effort when task motivation is high. For mission-oriented organizations with task-motivated employees, therefore, significant investments in and recruitment based on mission motivation are likely to be wasted.

The limitations of pecuniary compensation and the multiplicity of sources of intrinsic motivation confront organizations with the complex challenge of defining organizational objectives, designing tasks, and delineating human resource policies that optimally harness intrinsic and extrinsic motivation to elicit worker effort. Their challenge is further complicated by the effects of organizational arrangements that exploit one source of intrinsic motivation (e.g., the organization's mission) on intrinsic motivation driven by another (e.g., worker interest in the task). A key consideration for organizations, therefore, is the relative importance of different types of intrinsic motivation in eliciting worker effort.

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[1] Expenditure by non-profits on marketing, branding, and public relations may exceed $5 billion per year. See http://www.huffingtonpost.com/tom-watson/consumer-philanthropy-non_b_36261.html and http://adage.com/article/small-agency-diary/gooders-brands/127361/ for articles on this issue. Though pinning down the exact amounts is difficult, we know the sums are large because marketing agencies specialize in the nonprofit sector: see https://towerbrands.com/marketing-for-charities-not-for-profits-and-ngos/. One objective of this spending is to shape the external image of the organization and to raise funds (Seo, Kim, and Yang, 2009). Another, however, is to enhance the organization's own productivity by strengthening the attachment of employees to the organization's mission.

We focus on the behavior of 248 advanced medical and nursing students, for whom both task and mission motivation are likely to be salient, in a country, Burkina Faso, where extrinsic compensation for health workers is loosely related to actual effort. The between-subjects design randomly assigns subjects to undertake one of three possible tasks: two low motivation and one high motivation. The high-motivation task closely reflects the real-world professional activities that these students have demonstrated, through their educational and career choices, that they prefer. Participation in the task is voluntary and independent of pay. Approximately half of the subjects are given a mission: their effort elicits donations to a poor primary school.

Subjects undertake the task, in two-minute intervals, as many times as they like, up to a maximum of 16 times (32 minutes). At the end of each interval, they are asked if they would like to continue the task or quit. If they quit, they complete a post-experiment survey, after which subjects are paid and free to leave. In one low-motivation task, subjects sit in front of a blank computer screen and do nothing (i.e., the task is simply a waste of time). The second low-motivation task asks subjects to move sliders on a computer screen (i.e., the task is boring). The third task has high motivation and asks subjects to engage their medical knowledge: subjects view computer videos of a patient describing her (or her child's) medical conditions and then answer questions about how to treat the patient based on the information in the videos. In addition, half of the subjects engaged in each task are provided a mission: engaging in the task generates donations to a poor school. These tasks are preceded by measures of subject motivation towards the mission, and subject ability in the task (which serve as controls for the analysis).

Subjects engage in significantly more effort in the high motivation medical task. More surprisingly, mission motivation affects effort only on low-motivation tasks. Prior research finds that mission-orientation has a significant effect on subject effort (Banuri and Keefer, 2016). Consistent with this, we find that subjects who engage in low-motivation tasks work significantly harder in the presence of a mission (i.e., when their effort benefits children in a poor school). However, subjects engaged in the high-motivation task exert no greater effort when their effort benefits these children than when it does not: the quantity of effort is the same, regardless of whether the task has a mission.

These results have important implications for organizations. Prior research emphasizes potentially large payoffs, including lower wage costs, for organizations that can recruit workers who share their mission orientation. Our work suggests that mission orientation makes no contribution to effort when workers are highly task motivated. To the extent that mission and task motivation are not correlated, organizations are likely to incur a cost if they use mission criteria to place individuals with lower task motivation into tasks that elicit substantial effort among more

task-motivated individuals. In contrast, organizations benefit significantly if they emphasize mission motivation in recruitment for tasks that elicit little task motivation. Our analysis also has implications for different strands of literature on intrinsic motivation; these contributions are discussed in the next section. We then describe the experimental design and present the results.

Contribution to Prior Research

Voluminous research addresses the impact of different nonpecuniary motivations on effort and the degree to which pecuniary motivation crowds out nonpecuniary motivation. Our study, by comparing two important nonpecuniary motivations, addresses two gaps in this literature. First, it quantifies the importance for effort of task relative to mission motivation; second, it examines whether motivation crowding theory (Frey and Jegen, 2001; Frey and Oberholzer-Gee, 1997) applies to nonpecuniary motivations in the same way as it does to pecuniary and nonpecuniary motivations.

A wealth of studies have examined the relative contributions of extrinsic and intrinsic motivation to effort. In economics, Bénabou and Tirole (2006) analyze the effect of pecuniary incentives on effort in pro-social tasks. D'Adda (2011) does the same in the context of a field experiment examining forest conservation in Bolivia. Fehr and Gaechter (2000) and Fehr, Gaechter and Kirchsteiger (1997) find that pecuniary incentives crowd out intrinsic motivations to engage in reciprocal behavior. Reeson and Tisdell (2008) show that pecuniary incentives crowd out nonpecuniary motivations to contribute to public goods. Jones, Tonin, and Vlassopoulos (2018) ask the question in another way and show that performance pay has a larger effect on effort in the absence of a mission than when a mission is present. In their analysis of 128 studies in the psychology literature, Deci, Koestner, and Ryan (1999) conclude that the evidence supports the hypothesis that extrinsic motivation suppresses intrinsic motivation to exert on-the-job effort. However, the precise sources of intrinsic and extrinsic motivations are either heterogeneous or not identified. Judge et al. (2001) conclude that the hundreds of studies on the effects of job satisfaction on job performance point to a modest positive relationship, but that the literature is plagued by heterogeneity in the definition and measurement of these variables. Gagné and Deci (2005) emphasize the importance of this ambiguity: the effects of pecuniary on nonpecuniary incentives would be more precisely identified if it were known whether workers found their tasks interesting, or whether they were motivated by the mission of their job. We disentangle these two motivations.

By focusing on task motivation and its interaction with mission incentives, we contribute to a substantial literature that focuses instead on the interaction between extrinsic factors and other forms of social/mission motivation. For example, Bandiera, Barankay, and Rasul (2005, 2007, 2000, 2010) report a series of field experiments manipulating extrinsic incentives and social motives among fruit-pickers. Social interactions are significant motivators, but less so when extrinsic incentives are high. Ashraf et al. (2014) introduce social incentives (using a tournament), which they find have a larger impact on effort than pecuniary incentives. The workers in these studies are engaged in low-skilled low-motivation tasks, raising the question of whether social motives also stimulate effort when task motivation is high. We address this question of external validity by focusing on the interaction of two types of intrinsic motives that are often found in high-skilled jobs, task and mission incentives.

A handful of papers, all in psychology, look specifically at the interaction of task and pecuniary motivation. Building on Fessler (2003), Bailey and Fessler (2011) find that pecuniary compensation has a smaller effect on subject effort the more interesting the task is to the subject.[2] Pokorny (2008) also examines whether the effects of pecuniary incentives depend on task motivation. We advance research in this area both methodologically and substantively. Methodologically, we infer subjects' task motivation from their real-world choices: their investments in medical education. Previous work assesses the "attractiveness" to subjects of the task (e.g., assembling puzzles), using subjects' own ratings of the attractiveness of the puzzle picture. Substantively, we examine a different issue, the interaction between two types of intrinsic motivation, task and mission.

A central concern of the economics literature has been the effect of mission motivation on worker effort: to what extent does a strong match between the mission of an organization and the mission preferences of a worker increase worker effort? Benabou and Tirole (2006), Besley and Ghatak (2005), Ellingsen and Johannesson (2008), Francois (2000), and Prendergast (2007) are only a few of the many theoretical contributions in this area. The empirical literature has confirmed that mission matching leads to increased effort (e.g., Ashraf, Bandiera, and Jack, 2014; Banuri and Keefer, 2016; Carpenter and Gong, 2016). None of this work, either theoretical or empirical,

[2] They are also concerned with task complexity, which they vary by setting the initial orientation of puzzle pieces such that puzzle assembly would be easier or more difficult for subjects. They find no effects of either salaries or task attractiveness when the task is complex. This could be the result of a small number of subjects in the treatment arm (they had 80 participants and 8 treatment arms). We find, in contrast, and in a much larger sample, that the effects of mission motivation are strongest when tasks are uninteresting and simple, and weakest when they are interesting and complex.

considers task motivation and the relative magnitudes of the effort effects of task and mission motivation.

While no prior research examines the effects of mission motivation in the presence of task motivation, Ariely, Bracha and Meier (2009) and Carpenter and Myers (2010) examine trade-offs across extrinsic motivation, mission orientation, and image motivation concerns. Ariely, Bracha and Meier (2009) show that pro-social effort declines when pecuniary incentives increase and effort is private information. Both Ariely, Bracha, and Meier (2009) and Carpenter and Myers (2010) conclude that extrinsic incentives have less effect on effort when effort is public and image motivation concerns are present.[3] Friedrichsen and Engelmann (2017) find that subjects who care more about social approval are more likely to state a preference for fair trade when their statement is public knowledge, but only among those subjects who are not intrinsically motivated to buy fair trade products. Hanna and Wang (2017) find that corruption deters the self-selection of pro-social individuals into the public sector.

Model and Experimental Design

We randomly allocate subjects to one of six treatments that vary with respect to task and mission motivation. Their utility from the task is a function of their salary, the intrinsic reward they receive from performing the task itself, and the intrinsic benefit they receive from the benefits that their task confers on others (through contributions made to a school attended by poor children). The literature on crowding-out hypothesizes that pecuniary rewards reduce the intrinsic reward from performing a task (Ariely, Bracha, and Meier, 2009; Benabou and Tirole, 2003; Frey and Jegen, 2001; Frey and Oberholzer-Gee, 1997; Georgellis, Iossa, and Tabvuma, 2011). No such behavioral hypothesis exists with respect to different types of intrinsic incentives, such as task and mission motivation.

We conjecture that there are diminishing returns to effort, such that, for a sufficiently large effect of one type of motivation, changes in the other type have a (relatively) small effect on effort. Worker utility is separable in the welfare improvements that they experience from engaging in tasks that are intrinsically rewarding or that satisfy their social preferences, and the disutility caused by the exertion that effort requires. Assume that worker contribution to output is given by $ln(e_i)$, a function of effort, e_i. DellaVigna (2017) recommends that the functional form for the cost

[3] As we do, Carpenter and Myers (2010) study the behavior of a group of individuals—volunteer firefighters—who might be expected to be particularly motivated by their task. However, their research is not concerned with this aspect of intrinsic motivation.

of effort allow for the elasticity of effort with respect to the "value" of effort to vary. The cost of effort is therefore given by the power function $\frac{e^{\gamma}}{\gamma}$, where γ is the value of effort (literally, the degree of curvature in the effort function, as in Bellemare and Shearer, 2009). The cost of effort increases in effort, $\gamma > 1$. Worker utility is then given by:

$$(1) \qquad u_i = w + (\varphi_i + \theta_i) ln\big(e_{ij}\big) - \frac{e^{\gamma}}{\gamma}.$$

In (1), worker utility rises with the flat salary, w, which is independent of their effort. It rises with effort depending on workers' task motivation φ_{ij} and mission, θ_i, but at a declining rate. The exertion required by additional effort similarly reduces utility, but at an increasing rate, $\frac{e^{\gamma}}{\gamma}$.

Maximizing utility with respect to effort yields optimal effort $e_{ij}^{*} = \big(\varphi_{ij} + \theta_i\big)^{\frac{1}{\gamma}}$. The two key comparative statics that we examine below are $\frac{\partial e_i^{*}}{\partial \theta_i} = \frac{1}{\gamma}(\varphi_i + \theta_i)^{\frac{1-\gamma}{\gamma}} > 0$ and $\frac{\partial e_i^{*}}{\partial \varphi_i} = \frac{1}{\gamma}(\varphi_i + \theta_i)^{\frac{1-\gamma}{\gamma}} > 0$: effort rises in motivation. However, crucially, the degree to which an increase in one type of intrinsic motivation increases effort is dependent on the contribution to utility of the other type of intrinsic motivation: $\frac{\partial e_i^{*2}}{\partial \varphi_i \partial \theta_i}, \frac{\partial e_i^{*2}}{\partial \theta_i \partial \varphi_i} < 0$. Introducing mission motivation, $\theta_i > 0$, into a task should have a smaller effect on effort the more motivating is the task (the greater is φ_i), and vice versa.[4]

We estimate the magnitude of task motivation on effort by comparing effort across three tasks with different motivation, $\varphi_{i1}, \varphi_{i2} < \varphi_{i3}$ and find that $e_{i3}^{*} > e_{i2}^{*}, e_{i1}^{*}$. In addition, we test whether the effort effects of mission motivation decline with task motivation and find that $\frac{\partial e_{i1}^{*}}{\partial \theta_i} > \frac{\partial e_{i2,3}^{*}}{\partial \theta_i}$: mission motivation significantly increases effort only when task motivation is low. The reverse is not true, however: task motivation varies little whether or not the mission is significant. These point to high task motivation φ_{ij} relative to mission motivation θ_i.

We conduct a 2 x 3 between-subjects experiment that varies task and mission motivation (see Table 1). The experiment has the following blocks (see Figure 1). To measure mission motivation, all subjects play a dictator game, where the beneficiary is a poor school in Burkina Faso (subjects are provided basic information on the school along with some pictures of the

[4] Note that the same prediction emerges if we assume that there is a ceiling on effort. In this case, if one type of motivation is sufficient to induce effort close to the ceiling, we should observe no additional effect from other types of motivation. A ceiling effect would be particularly salient for measuring effort on the intensive margin—the amount of production per hour, for example. We focus on effort on the extensive margin (similar to Abeler et al., 2011, where subjects also choose when to stop working), however, the amount of time that individuals spend on their task, which in our experimental setting does not have a ceiling.

students and facilities). Next, in all treatments we measure subject ability to undertake one low motivation (slider) and one high motivation (medical) task.[5] After the motivation and ability blocks, subjects were randomly assigned to one of the three tasks (blank, slider, or medical task). Half of the subjects in each task (randomly assigned) are given a mission: their effort generated monetary donations to the poor school. For the remaining subjects, effort yielded no benefits for the school.

In no treatment does additional effort yield additional pecuniary benefits for the subject. Feedback may have an independent effect on effort (Bloom and Van Reenen, 2007), hence subjects do not receive feedback about their performance in the task and are informed that they will not receive feedback. Subjects can engage in the core effort task a maximum of 16 times, for two minutes each time, yielding a maximum of 32 minutes. At the end of the effort task, subjects are given an exit survey, are paid their earnings, and then are free to leave.

Table 1: Number of Subjects, by Treatment

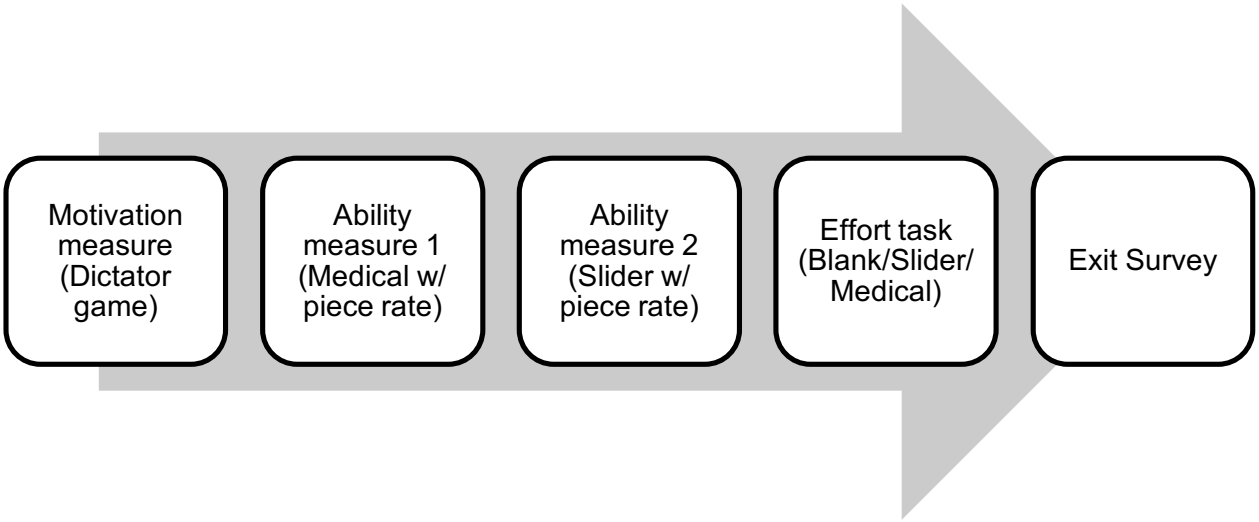
Task	**Blank**	**Slider**	**Medical**
No mission (no donation)	37	46	48
Mission (donation to school)	38	35	44

In the treatments with a mission, the effort task generated donations to the charity according to a piece rate: the more effort subjects provided, the higher the donations to the charity. Given the differences between the tasks, link between the task and the donation (i.e., the "donation rate") also can differ. Subject effort might be influenced by expected differences in donation rates across the three tasks with a mission. We therefore took care to calibrate the link between effort and donations so that within-round donations would be similar across the three tasks. However, as tasks were different, and the nature of the effort in each task was also different, relating effort to payments was a challenge. Since the blank task had no real output, we implemented a piece rate to charity based on the number of times subjects chose to continue the task (200 CFA—$0.42—was donated for each time subjects continued the task). For the slider task, based on previous work in other contexts (see Banuri and Keefer, 2016), subjects could comfortably move 20 sliders per each two-minute round. For this reason, we implemented a piece rate paid to the charity in

[5] Note that the "blank" task has no corresponding measure of ability, and hence no ability measure prior to conducting the task.

the slider task of 10 CFA—$0.02—per slider (equating 200 CFA per round on average). Finally, from previous tests with the medical task, we knew that subjects had a 50 percent rate of accuracy on average in the medical task. As each two-minute case contained four questions, we implemented a piece rate for charity of 100 CFA—$0.21—for each correct response (equating 200 CFA per round on average).

Figure 1: Structure of the Experiment



Assessing Task Motivation

We employ a novel approach to identify motivating tasks. Our subjects are medical students who, by their costly decision to enter nursing or medical school, revealed a strong preference for health-related tasks. The task that we judge to be the most motivating, because it matches the real-world choices of the subjects, is the one that involves analyzing patient reports of illness. We contrast effort under this task with effort under two other (low-motivation) tasks, one requiring subjects to sit idly in front of a blank computer screen, and the other that asks them to manipulate sliders on a computer screen.

Pokorny (2008) also assesses effort differences between two tasks, taking an IQ test or counting the number of “ones” and “sevens” in blocks of random numbers. The IQ test, plausibly offering greater task motivation, elicits greater effort. With our medical task, we can further buttress our claim that it offers the greatest task motivation by pointing to the correspondence between the task and the real-world choices of our subject pool.

Most prior research relies on surveys to establish motivation. Subjects are first asked to perform different tasks, and then they are asked how attractive or enjoyable the task was (e.g.,

Bailey and Fessler, 2011). We do not rely on subject assessments of task interest, which could give rise to consistency bias if individuals who indicate that they prefer a task subsequently work harder on it for precisely that reason.

The experimental design assumes that subjects engaged in the medical task are more task-motivated. It is possible that these individuals are also more image-conscious: they care about exerting effort in the medical task because, as medical professionals, their effort on the medical task, but not on the Blank and Slider tasks, affects their image as medical professionals. This is not the most plausible interpretation of the experimental results, however. First, when studying image effects, Ariely, Bracha, and Meier (2009) and Carpenter and Myers (2010) focus on public revelation of effort. In our experiments, only the experimenter knows subject effort. Second, the experiment entails no feedback to subjects, reducing even the salience of experimenter knowledge. This leaves concerns about "self-image" as a potential alternative interpretation of the greater effort undertaken by subjects in the medical task relative to the other tasks. However, as long as subjects' choice of career is related to their enjoyment of medical tasks, task motivation remains a more plausible driver of the results presented below.

Measuring Mission Motivation

Mission motivation depends on the degree to which the task mission corresponds to the mission preferences of subjects. The greater is this match, the more effort subjects should exert. As in Ashraf, Bandiera, and Jack (2014) and Banuri and Keefer (2016), we measure the mission motivation of subjects by asking them to play a modified version of the dictator game, with a poor primary school as the beneficiary.[6,7]

Subjects were asked to donate as much as they liked out of an endowment of 1,250 CFA ($2.60) to the primary school.[8] Prior to making their decision, subjects were informed about the size of the school and the socioeconomic characteristics of its student body. To enhance the

[6] In a typical dictator game, subjects are randomly assigned to groups of two, and one of them receives an endowment of $10. The first player can transfer any proportion of the $10 to the other player. Typically, individuals give on average about 10 percent of their endowment to the other player (Hoffman et al., 1994; Eckel and Grossman, 1996). We change the standard setup by replacing the second player with a poor primary school (Gampela 3) on the outskirts of Ouagadougou, the capital of Burkina Faso.

[7] A large literature in behavioral economics uses the dictator game as its core measure of altruism and pro-social behavior (Eckel and Grossman, 1996; Forsythe et al., 1994; Whitt and Wilson, 2007; among many others). Previous research has also replaced the recipient of the dictator game from a student to a charitable organization (Carpenter et al. 2008; Eckel and Grossman, 1996; Li et al., 2010; among others). Eckel and Grossman (1996) find, for example, that subjects give substantially more when the anonymous recipient is replaced with a charity (in their case, the American Red Cross).

[8] The annual income per capita of Burkina Faso (in current US dollars) was approximately $720 in 2014. The dictator endowment is approximately 134 percent of daily income per capita.

salience of the mission, subjects were shown a photograph of students sitting in a school classroom (see Appendix). Our measure is thus an ideal measure of mission motivation, since this same school was also the beneficiary of all mission-oriented tasks in the experiment.

Measuring Effort

The key issue, here and in the literature, is the degree to which nonpecuniary motivation affects real effort. However, it is almost never possible to measure the exact mental, physical, and emotional exertion that real effort entailed. Instead, researchers typically measure the output that subjects produce because of their effort. These measures are intrinsically noisy, reflecting not only subject motivation to exert effort, but also subjects' ability to undertake the task. An additional, important challenge when analyzing task motivation specifically is that different tasks yield different outputs, making it difficult to compare effort across tasks.

We address the issue of comparability by creating a uniform measure of effort across tasks, the number of two-minute segments that subjects choose to spend on the task. The time that individuals spend on a task is only one of several types of exertion that effort could entail. For example, the effort required to spend time on a task may require a different type of exertion than the effort required to do the task well. However, when tasks are heterogeneous, effort exerted on quality is not comparable across tasks.[9] The time measure is homogeneous across tasks.[10]

In the first low-motivation task (the "Blank" task), subjects sit in front of a blank computer screen. Only one measure of effort is relevant here, the number of two-minute segments that subjects undertake to complete. The second low-motivation task is the "Slider" task adapted from Gill and Prowse (2012). It demands real effort and some ability but is nevertheless dull. Subjects are shown 48 sliders on a computer screen. Each slider is set on the left, and the task for subjects is to move the slider precisely to the center of the slider bar. In each two-minute segment, subjects are asked to complete as many sliders as they can.[11] One frequently used measure of effort with

[9] This would again require comparing effort across tasks by measuring differences in output, but the outputs are heterogeneous and not comparable. One input into both quality and output is ability; our results, using time as a measure of effort, are robust to controlling for ability.

[10] Unobserved differences in ability could have an indirect effect to the extent that higher ability individuals are more motivated by the task. This, however, is a source of noise in cross-task measurements of effort, not bias, since individuals are randomly assigned to tasks. Similarly, subjects may have unobserved differences in their opportunity costs of time. In practice, this unobserved difference refers to unobserved differences in the utility that subjects could gain by leaving the experiment 30 minutes early to study or chat with friends. Given the homogeneity of our subject pool, it is reasonable to assume that unobserved differences along these dimensions were small. Again, in any case, the random assignment of individuals to tasks mitigates this concern.

[11] The use of this computerized version of the "envelope-folding effort task" to simulate effort costs is common in the literature (Banuri and Keefer, 2016; Breuer, 2013; Georganas, Tonin, and Vlassopoulos, 2015; Ibañez and Schaffland, 2013; among others).

this task is the number of sliders that subjects move precisely to the center in every two-minute segment. However, because we want to compare effort across tasks, we instead simply count the number of two-minute segments that subjects choose to engage in the task.

Because we were working with subjects who have chosen medical careers, we determined that the medical task would generally elicit a high level of task motivation. Standard approaches to measuring medical knowledge rely on survey vignettes that inform subjects about patient symptoms and then ask them to provide a diagnosis. We take a similar approach. Dr. Maurice Ye, of the Medical Research Center in Nouna, Burkina Faso, worked with us to create 20 cases of conditions that medical professionals in Burkina Faso would commonly encounter. They ranged from malaria and malnutrition to difficult pregnancies and focused especially on maternal and early childhood care.

The development of each case entailed creating four multiple-choice questions and associated answers. The first question asked the subject to make a diagnosis; the second to identify the correct treatment; the third to indicate if, and when, the patient should return for a follow-up visit; and the final question asked for the most appropriate follow-up treatment in case the initial treatment failed. Since medical cases were randomly assigned to subjects, cross-subject variation in the cases that they viewed could generate noise in the measurement of treatment effects. To reduce noise, great care was taken to ensure that the questions across cases were equally difficult to answer. For each question, the answers were designed so that one answer was correct, two were "almost correct" (e.g., they were consistent with most, but not all symptoms described), and two were entirely wrong.

We then worked with a film company to turn the cases into videos, hiring a screenwriter to develop scripts for each case and a professional actress to play the role of the patient or mother of a patient.[12] All of the videos were in French. Local languages are commonly used by patients, but French is also typical, is the language of instruction in nursing and medical school, and was at least the second language of all the subjects. In the filming of the videos, care was taken to ensure that camera angles and the actress' posture remained the same; to maintain interest, the video included close-ups, but camera movements were carefully controlled and homogeneous

[12] Here is the English transcript of one of the cases, in which the patient suffered from mastitis: "Hello Doctor. I gave birth in your health center approximately one month ago. I'm back with another concern. Three weeks after my delivery, I started having pains in my right breast. My baby sucks a lot, it's too much. He nurses so much that I cannot close my eyes at night. From time to time, I get very hot. I have a fever and headaches; especially at night. Sometimes it gives me insomnia. I thus came to ask for your help in relieving my pain." Additional information germane to the diagnosis was also provided, such as temperature, pulse, blood pressure, and additional notes from examining the patient. For more information on the development of the cases and videos, please see: http://www.rbfhealth.org/blog/measuring-quality-health-care-using-video-vignettes.

across cases. The videos and questions were then incorporated into a computer-based task. Each video lasted for 60 seconds. Subjects could re-watch the video, rewind, forward, or stop it entirely. Subjects could answer questions while watching the video as well. However, each segment lasted two minutes, regardless of whether the subject had completed all the questions.[13] As with the other two tasks, we use an effort measure that is unaffected by ability, the number of two-minute segments that subjects engaged in the task.

Measuring Ability

Each treatment in Figure 1 yields a measure of subject ability for the two tasks where ability matters: the slider and medical tasks. It is possible that ability to undertake the tasks successfully might influence how much time individuals are willing to engage in the tasks. Hence, we use these measures to check the robustness of the main results to controls for subject ability. The ability measures were implemented across all treatments. Ability in the medical task, ability measure 1, was based on the number of correct answers subjects gave after watching four medical cases. Subjects were told to review the four cases and informed that they would be paid 100 CFA—$0.21—for each correct response. There was no time limit and subjects spent 23.08 minutes (5.77 minutes per case) on average. They had an accuracy rate of 45 percent. Hence, subjects earned 723 CFA—$1.50—on average in the medical ability measure.

Ability in the slider task, ability measure 2, was measured by asking subjects to undertake four rounds of the slider task. They were informed that they would be paid 10 CFA—$0.02—for every slider correctly positioned. In each round, subjects had a fixed amount of time (two minutes) to move as many sliders as they could. Subjects correctly positioned 20.03 sliders (5.01 sliders per round) on average. Hence, subjects earned 200 CFA—$0.42—on average in the slider ability measure.

Additional Measures and Payment Procedures

In addition to the compensation they received from the experimental blocks where ability was measured, subjects received a flat wage of 4,000 CFA ($8.32) for engaging in the final effort task. All sessions were conducted in May 2014. In addition, since subjects used a mouse to manipulate the sliders in the slider task, care was taken to utilize identical mice and computers at each location and to use the same screen resolution on the computers to minimize differences across samples. Since this was an individual task, multiple treatments took place within the same

[13] For more details on the medical cases, please see Banuri et al. (2017), also summarized here: http://www.rbfhealth.org/blog/measuring-quality-health-care-using-video-vignettes.

session. Subjects were randomly assigned to seats within the computer lab, and the actual treatments were randomly selected by the computer. 248 subjects participated in the specific experiments analyzed here; in the much larger project, of which these experiments were a part, 1,119 subjects participated.

After completing all the experimental tasks, subjects completed an extensive survey recording subject demographics. Each subject was informed that the total donation to the school generated by their actions would be put in sealed box and donated to the school at the end of the study period. Donations were contained in sealed plastic boxes typically used for collecting votes during elections. Subjects watched as their donations were placed in the sealed container.

Fourth- and fifth-year medical students from the University of Ouagadougou (N=121) and third-year nursing students from the National School of Nursing (École Nationale de Santé Publique; N=131) participated in the experiments. Subjects were recruited by posting flyers and through briefing sessions with representatives of student unions. The flyers indicated that participants would play games and be able to earn money. It did not reveal the nature or purpose of the experiments.

All earnings were expressed in tokens, with an exchange rate of 1.00 CFA per token.[14] Subjects were paid in cash at the end of each session according to their decisions in the motivation measure (dictator game), the ability measure with sliders based on their performance (piece rate), the ability measure with medical cases based on their performance (piece rate), and the flat salary for the core effort task (independent of effort exerted). Donations to the school were generated based on the mission motivation measure (dictator game); and subject task effort in in those treatments with a mission. The average subject earned a sizeable amount, 5,742 CFA ($11.94, or more than five times the daily per capita income in the country). The average payment to charity, per subject, was 978 CFA ($2.03). Table 2 presents the summary statistics for the entire sample and by treatment.

The final column reports the *p*-value from an *F*-test of the null hypothesis that the means are the same across the experimental groups. Along five dimensions, subject characteristics are not perfectly balanced. This is not surprising given the relatively small sample. Across all experimental groups, subjects are in their mid- to upper-twenties, but the mean ages of the oldest and youngest groups differ by about three years. Ability scores in the slider task, but not other tasks, differ significantly across groups. Mean subject responses to a question about personal

[14] We use "tokens" rather than cash to facilitate replication across cultures: currency focal points vary across countries. In implementing tokens, experimental protocols and instructions remain identical even when conducting experiments in different contexts. Though tokens reinforce the artificiality of the lab, replicability is a more important concern.

finances differ significantly across groups, but the differences are economically small (on average, all groups indicate that they are between 1.5 and 2.0 on a 0–3 scale). Average education levels differ across groups but again the differences are small in magnitude, amounting at most to a few months on a five-year scale. Midwives are over-represented in two treatments. The results below indicate that none of these variables is significantly correlated with subject effort and none affects estimated treatment effects.

Table 2: Summary Statistics

	All treatments	Treatment: Blank	Treatment: Blank with mission	Treatment: Slider	Treatment: Slider with mission	Treatment: Medical	Treatment: Medical with mission	Joint F-test
Observations	248	37	38	46	35	48	44	
Age (years)	27.95 (5.15)	26.49 (4.03)	26.74 (5.53)	27.83 (4.42)	28.66 (5.55)	29.58 (6.12)	28.02 (4.53)	0.058
Female	0.50 (0.50)	0.38 (0.49)	0.45 (0.50)	0.46 (0.50)	0.57 (0.50)	0.58 (0.50)	0.52 (0.51)	0.411
Tokens donated to school (Dictator max: 1,250)	431.63 (334.53)	468.27 (304.19)	507.24 (386.46)	456.63 (376.32)	372.50 (273.49)	394.27 (342.21)	397.16 (298.36)	0.443
Score in slider task ability measure (Max: 192)	20.03 (16.73)	21.24 (15.53)	29.45 (16.34)	17.09 (15.81)	19.57 (16.87)	15.23 (15.02)	19.57 (18.13)	0.003
Score in medical task ability measure (Max: 16)	7.23 (1.96)	7.51 (1.79)	6.95 (1.66)	7.02 (2.24)	7.17 (1.81)	7.56 (1.98)	7.14 (2.14)	0.612
Risk preferences (5 = Risk seeking)[a]	2.70 (1.13)	2.89 (1.17)	2.74 (1.00)	2.85 (1.09)	2.71 (1.23)	2.38 (1.14)	2.52 (1.09)	0.234
Current state of personal finances (3 = Good)	1.75 (0.64)	1.97 (0.76)	1.76 (0.68)	1.52 (0.51)	1.74 (0.56)	1.77 (0.69)	1.77 (0.60)	0.065
Confidence in payment to schools (5 = Confident)	3.75 (1.16)	3.51 (1.43)	3.82 (0.98)	3.52 (1.30)	4.00 (0.87)	3.81 (1.16)	3.84 (1.12)	0.368
Clarity of instructions (5 = Always clear)	3.90 (1.15)	4.16 (0.93)	4.11 (0.92)	3.96 (1.07)	3.71 (1.13)	3.67 (1.08)	3.86 (1.15)	0.201
Education level (5 = 5th year)	3.71 (0.89)	3.95 (1.00)	3.97 (0.97)	3.67 (0.79)	3.66 (0.84)	3.50 (0.74)	3.61 (0.89)	0.094
Qualifications								
Nurses (%)	0.28 (0.45)	0.22 (0.42)	0.24 (0.43)	0.35 (0.48)	0.26 (0.44)	0.21 (0.41)	0.39 (0.49)	0.315
Midwife (%)	0.25 (0.43)	0.16 (0.37)	0.11 (0.31)	0.17 (0.38)	0.31 (0.47)	0.46 (0.50)	0.25 (0.44)	0.002
Doctor (%)	0.47 (0.50)	0.62 (0.49)	0.66 (0.48)	0.46 (0.50)	0.43 (0.50)	0.33 (0.48)	0.36 (0.49)	0.011

Notes: Cells indicate the means and (standard deviations) of subject characteristics. To select subjects at the appropriate level of education to participate in the medical task, we explicitly recruited final year (3rd year) students at the Nursing school, and 4th / 5th year students at the medical school. These students had the appropriate level of experience in terms of course- and fieldwork.

[a] Risk preferences were measured using a survey question "In general, would you say that you are someone who takes risks, or do you avoid taking risks?" Responses were measured using a 5-point Likert scale with 1 = "Prefer to avoid risks"; 5 = "Prefer taking risks."

Results

The experiments shed light on two questions: How important is task motivation for effort? And does mission motivation crowd out the effects of task motivation on effort? The experimental design allows us to compare effort across the three diverse tasks with a simple metric: the number of times subjects chose to continue engaging in the task, each time for two minutes (fixed by design). At the end of each two-minute interval, subjects were given the opportunity to end the task and continue to the exit survey, after which they were paid and were free to leave. To assess the effects of task motivation on effort, we compare this measure of effort across tasks holding constant private returns (the flat salary is the same in all treatments) and mission, or lack of mission (i.e., effort does not yield contributions to the poor school).

Figure 2: Effort, Task, and Mission Motivation

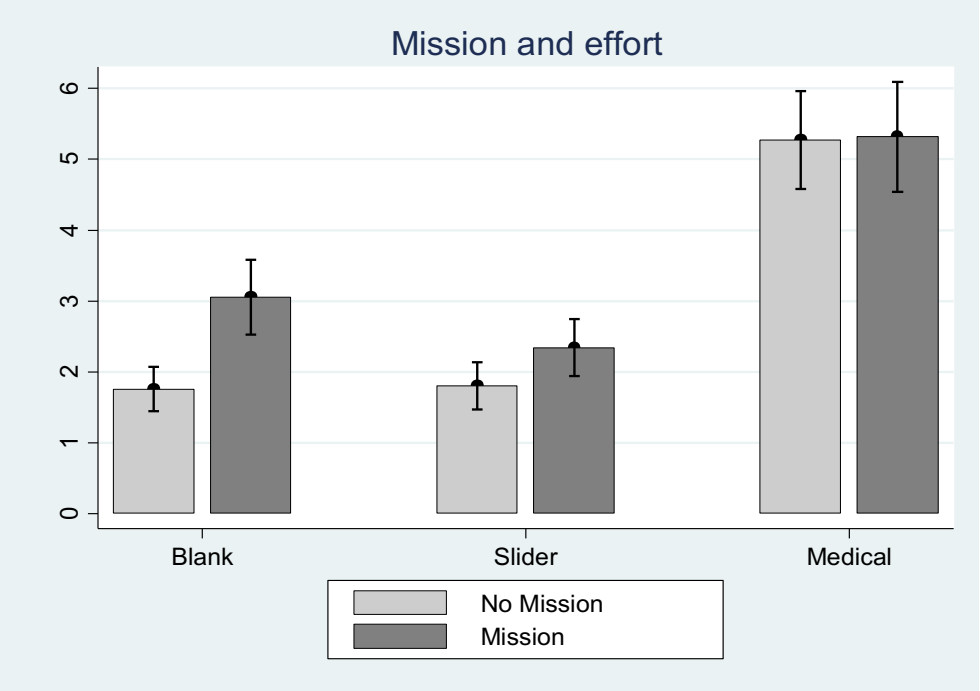


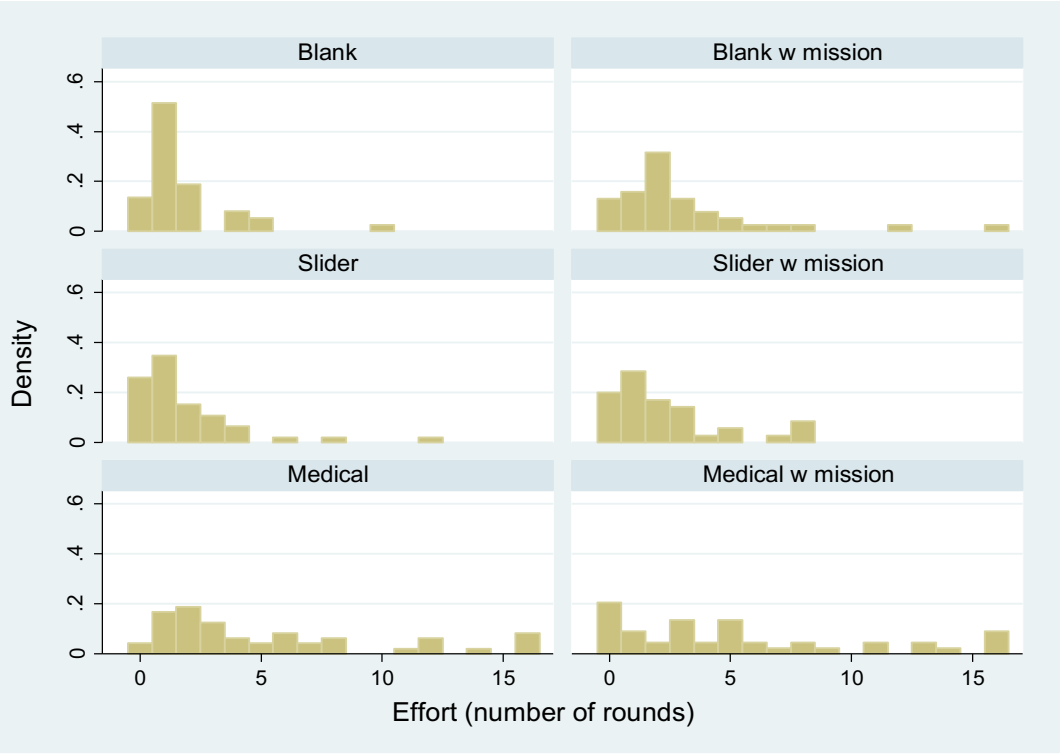
Figure 2 compares the number of rounds (i.e., time) spent by subjects across the tasks, distinguishing between treatments with and without a mission. Results across tasks without a mission are entirely intuitive: subjects spent significantly more time on the most interesting task—the medical task—earning no additional reward, than they did on the slider or blank tasks ($p<0.01$). There was no significant difference in the number of rounds (time) spent between the two tasks with low task motivation.

The second question we address is whether the extra effort exerted by mission-motivated individuals depends on their level of task motivation. This question demands within-task, between subject comparisons: how does an increase in mission motivation affect subject effort across each of the three tasks? If task motivation reduces the returns to mission motivation, mission motivation should have a significant effect on effort in the low-motivation blank screen and slider tasks, but a smaller effect on the high-motivation medical task. The results displayed in Figure 2 are consistent with this prediction.

Comparing the first two bars in Figure 2, mission motivation matters in the absence of task motivation: subjects who engage in the Blank task spend nearly 75 percent more time on the task when their effort benefits the poor school than when it does not (p<0.05). Time spent in the slider task increases by 30 percent when subject effort benefits the poor school, though this increase is not significant (p=0.30). However, we earlier conjectured that if there are diminishing effects of intrinsic motivation, mission motivation should have little or no effect on effort in the high-motivation task. This turns out to be the case. Effort on the medical task is indistinguishable across the mission and non-mission settings (the last two bars of Figure 2 indicate an increase of just one percent; p=0.96).

One possible explanation for the similarity of effort in the medical task between the mission and non-mission settings is that those engaged in the medical task are so task-motivated that mission motivation cannot further increase their effort. Figure 3, depicting the distribution of effort across tasks and missions, shows that this is not the case. First, the density of effort is skewed to the left for low motivation tasks; the presence of a mission notably attenuates this skewedness in the low-motivation tasks. Second, however, if task motivation prompted subjects to exert maximum effort, we would expect a significant skew to the right in the distribution of effort in this task. Instead, though, the distribution is widely dispersed across all effort levels.

Figure 3: Distribution of Effort across all Treatments



We further investigate whether the effects identified in Figure 2 are driven by characteristics of the subject population. The relationship between task motivation and effort can then be identified in estimates of the following Tobit regression, which compares effort in five of the treatments to effort in the sixth, omitted treatment, the Blank task with no mission:

$$EFFORT_i = \alpha + \varphi_2 Blank\ with\ Mission_i + \beta_1 Slider, No\ Mission_i + \beta_2 Slider\ with\ Mission_i + \gamma_1 Medical, No\ Mission_i + \gamma_2 Medical\ with\ Mission_i + \delta CONTROLS_i + \varepsilon_i$$

where the dependent variable is the number of two-minute intervals spent on the task, the *Slider* dummy captures the motivational effects of the slider task relative to the omitted blank-screen task; and the *Medical* dummy yields an estimate of the task motivation of the health task relative to the blank screen. Three additional treatment dummies capture the mission treatments. The omitted, benchmark category is the blank task with no mission. We expect effort to be higher in the mission than the non-mission task, but only in the low motivation tasks. Hence, the coefficients on φ_2 and β_2 should be positive, and β_2 should be larger than β_1. However, γ_2 should not be different from γ_1.

Table 3: Task and Mission Motivation, Controlling for Observables

Dependent variable: Effort (Number of rounds)				
	I	II	III	IV
Treatment: Blank with Mission	1.320*	1.290**	1.477**	1.553***
	(0.68)	(0.62)	(0.62)	(0.59)
Treatment: Slider, No Mission	0.048	0.071	0.247	0.373
	(0.29)	(0.33)	(0.31)	(0.29)
Treatment: Slider with Mission	0.586	0.714	0.921*	1.244***
	(0.41)	(0.46)	(0.49)	(0.45)
Treatment: Medical, No Mission	3.604***	3.862***	4.001***	4.418***
	(0.58)	(0.58)	(0.65)	(0.68)
Treatment: Medical with Mission	3.660***	3.692***	3.808***	4.099***
	(0.41)	(0.49)	(0.44)	(0.49)
Training: Midwife		-0.869	-0.425	-0.164
		(0.57)	(0.64)	(0.55)
Training: Doctor		-1.035	-1.492*	-1.638***
		(0.78)	(0.78)	(0.60)
Education level (years)		0.678	0.653	0.421
		(0.47)	(0.46)	(0.47)
Female			-1.152***	-1.005**
1 = Female			(0.41)	(0.39)
Age (years)			-0.040	-0.059*
			(0.04)	(0.03)
Current state of personal finances			0.264	0.376
4 = Excellent			(0.53)	(0.54)
Risk preferences				0.448***
5 = Risk seeking				(0.14)
Clarity of instructions				0.578***
5 = Always clear				(0.13)
Constant	1.757***	-0.136	1.147	-2.166
	(0.38)	(1.49)	(1.78)	(2.26)
Sigma				
Constant	3.691***	3.658***	3.623***	3.524***
	(0.35)	(0.35)	(0.33)	(0.35)
Pseudo R2	0.031	0.033	0.037	0.047
Log Likelihood	-666.2	-664.2	-661.8	-655.0
P	0.000	0.000	.	.
Observations	248	248	248	248
Right censored observations	9	9	9	9

Note: * p<0.1, ** p<0.05, *** p<0.01. Dependent variable is effort (number of rounds respondent chose to continue the task). Tobit specification with upper censors at 16 (the maximum rounds subjects continue prior to auto-exit), with clustered standard errors (by day) in parentheses. Table reports regression coefficients. Results are robust to an OLS specification. Controls also include confidence in payment to schools and donations to the school, neither significant.

The *CONTROLS* consist of: occupation dummies (the medical, nursing, or midwife students, since these students might be differently motivated by the medical task, or differently demotivated by the other tasks); gender; age; years spent in the institution; current state of financial resources; risk preferences; and subject self-assessment of the clarity of instructions (which may be important given that the task is unusual).

The results are displayed in Table 3. The central findings are in the first five rows, which compare the effort expended by subjects in five of the treatments to effort in the sixth, omitted Blank task. The first question is whether task motivation significantly increases effort. Across all specifications, regardless of mission, subjects expended more effort on the high-motivation Medical task relative to the Blank task ($p<0.01$ across all specifications). Again, regardless of mission, there are no differences in effort between the low-motivation Blank and Slider tasks ($p=0.87$ in model I – no controls – and $p=0.20$ in model IV – full set of controls). The findings in Table 3 provide direct, behavioral evidence that task-motivated subjects do, in fact, provide more effort, even in the absence of extrinsic rewards.

Turning to the second question, the effects of mission motivation, mission has a significant effect on effort when task motivation is low: the coefficient on the "Blank with mission" treatment dummy is significantly different from 0 across all specifications (with no controls, $p<0.10$, in line with Figure 2). In addition, the difference in the Slider and Slider with mission treatments, large but insignificant in the simple comparison of means in Figure 2 ($p=0.30$), is notably more significant when using a Tobit specification, clustering standard errors, and controlling for subject characteristics. With no controls, the estimated effect of the mission is one-half of a round of extra effort ($p=0.11$, the first column of Table 3). When controlling for occupation (nurse, midwife or doctor in model II), mission has a significant effect on effort on the slider task ($p<0.10$). This effect becomes even stronger with the full set of controls in model IV ($p<0.05$).[15] Hence, the presence of the mission increases effort when task motivation is low. When task motivation is high, the difference is not significant with ($p=0.61$) or without controls ($p=0.94$). These results are consistent with theory: introducing the mission increases effort, but only in low-motivation tasks (such as the Blank and Slider tasks).

[15] Estimates of the effects of the slider treatment on effort are, however, less stable across specifications than those of the other two tasks. The coefficient estimates on the medical treatments do not vary more than 22 percent across specifications, whereas those on the slider treatments vary as much as 677 percent. This is likely due to imbalance across experimental arms in slider ability (reported in Table 2) and to differences across subjects in slider task motivation, which are captured by controls for observables.

We can formally test the difference-in-difference proposition that mission has a larger effect on effort in tasks with low compared to high motivation. The effect of mission motivation on the Blank task is significantly larger than the effect of mission motivation on the medical task (p<0.01 using coefficients reported in model IV – full set of controls).[16] When comparing the effects of mission on the slider task relative to the medical task, the difference is not significant (p<0.15 using coefficients reported in model IV – full set of controls).[17] These results provide additional support for the claim that mission motivation has a smaller effect on effort when task motivation is high.

The Table 3 estimates also indicate that women exert significantly lower effort (p<0.05), which may indicate a higher opportunity cost of time (for example, greater household responsibilities in addition to time needed at school). Consistent with the opportunity costs of time, medical and older students also exert significantly lower effort. This is consistent with the possibility that the opportunity costs of time of medical students are greater (e.g., because of the demands of their coursework). As before, risk seekers and subjects that found the instructions to be clear were likely to exert higher effort overall. Finally, instruction clarity is also significantly related to effort: subjects who found the instructions to be clearer were more likely to exert effort than those who did not.

Our effort measure focuses on the extensive margin: how much time do subjects invest in the task? It has the great advantage that it is homogeneous across tasks with heterogeneous outputs. However, it is perhaps generally true, and it is certainly true in our experimental design, that ability plays a larger role in the successful performance of higher motivation tasks. Medical knowledge is essential to the correct diagnosis and treatment prescriptions of the medical task; subjects who are more dexterous in the manipulation of sliders will be able to correctly position a larger number of sliders precisely at the midpoint of the scale in any two-minute period. Ability could account for the results in Table 3 if more able individuals are also more motivated to persist in the ability-intensive task for longer periods. The possibility that more able individuals are more task-motivated does not undermine the conclusions we draw from Table 3, since it is still the case that motivated individuals exert greater effort. Our data nevertheless allow us to reject the hypothesis that ability differences drive the results in Table 3.

[16] A joint F-test was conducted testing whether the difference between coefficients of Medical with Mission and Medical, No Mission was different from the coefficient on Blank with Mission.

[17] A joint F-test was conducted testing whether the difference between coefficients of Medical with Mission and Medical, No Mission was different from the difference between coefficients of Slider with Mission and Slider, No Mission.

We measure ability in each treatment by providing subjects with a small piece rate for the number of sliders placed correctly or the number of medical questions correctly answered, over four rounds (the blank screen task has no ability component). We then estimated, in two separate estimations that included the controls in model IV in Table 4 plus the ability measure, the effect of mission on time spent on the slider task and on time spent on the medical task. Ability is insignificant, and the mission results are the same as in Table 3 (see Appendix Table 1).

Discussion: External Validity

Previous research on mission motivation suggests that organizations with a mission can increase productivity by recruiting individuals who share the mission. Our results indicate that if the jobs that the organization seeks to fill are reasonably interesting, the mission filter has little effect. Employees who share the organization's mission may exert no more effort than employees who do not.

In principle, the structure of the experiments yields a bias in favor of mission motivation: the tasks where mission matters are exceptionally lacking in motivation compared to the real-world tasks of mission-oriented organizations. Still, it could be the case that the experimental design associated with the high-motivation task artificially widens the gap between mission and task motivation. That is, compared to the experimental setting, it could be that in real-world mission-oriented organizations, high-motivation tasks are less interesting, and the mission is more compelling. This would lead us to spuriously generalize our conclusion that mission motivation yields less effort than task motivation.

The lab-in-the-field design attenuates this concern in two ways. First, it gives subjects a real mission—donations to a school—and increases the salience of the mission by showing subjects pictures of children at the school. This effort is successful, insofar as the effects of mission motivation on effort in the Blank task are not only statistically significant, but economically meaningful. It is, however, still possible that the children's welfare is less motivating for our subject pool than the welfare of patients personally known to them. Second, though, even if this is the case, the experimental task that elicits the greatest motivation—watching videos and answering multiple choice questions regarding a fictitious patient—is also likely to be less motivating than diagnosing and treating actual patients. The difference between the experimental mission and task motivations in the high-motivation task is therefore not obviously larger than in the case of real-world motivations of medical professionals, and might even be smaller, such that real-world effects might even be larger. This gives us greater confidence that the behavior we document in the lab is likely to mimic the behavior of medical staff in their everyday tasks.

The lab setting differs from real world workplace situations in other ways that might affect the external applicability of the findings. Because of the heterogeneity of tasks, we look at time spent on the task as our measure of effort. However, effort on the intensive margin may matter more in real-world organizations (working harder, not longer). Motivation effects on one need not translate to the other, though the conjecture that the effects are correlated seems more plausible than the conjecture that they are not. In our tasks, effort on the intensive margin can be measured by the number of sliders correctly placed and the number of questions correctly answered in the non-incentivized experimental blocks (not those where ability was measured, where subjects were paid according to their success rate in these two tasks). Subjects who worked longer also scored higher: subjects that worked an additional round longer in the slider treatments completed 0.27 additional sliders within each round ($p=0.157$). Subjects that worked an additional round longer in the medical treatments increased their score (number correct) by 0.01 within each round ($p<0.10$).

Still, a range of other differences between the lab and real-world setting are likely to be relevant for the translation of the findings reported here to organizational practice. They include the length of the work day, the type of contract, the social environments of the workplace, monitoring and oversight by managers, among other factors. In addition, our results may not apply to all types of professions, but they are likely to be broadly applicable to the mission sector, and organizations striving to implement corporate social responsibility. Further research is needed to understand how these additional factors interact with task and mission motivation. The experimental results reported here offer important guidance for that research: in regular workplace settings it will be important to disentangle different sources of motivation. One key contribution of our experiment is that we can isolate the impacts of different sources of motivation on employee effort.

Conclusions

This paper extends the literature on motivation and effort by offering new insights into the relative empirical importance of two nonpecuniary incentives, task and mission motivation, and by exploring the interactions between the two. Using a unique sample of students of the health professions in Burkina Faso, along with a medical effort task specifically designed to motivate them, we find that subjects exert significantly greater effort when task motivation is high. This effect is large compared to the effects of mission motivation. Furthermore, as in previous research, there are diminishing returns to motivation, a phenomenon we demonstrate, for the first time, in the context of task and mission motivation. When task motivation is high, additional

sources of nonpecuniary motivation (i.e., mission) do not increase effort. However, when task motivation is low, mission reinforcement significantly increases effort.

These findings point the way to a future research agenda. One goal of future research should be to better capture real-world motivations in experimental settings. Our experimental design comes closer than any other with which we are familiar in finding a task that closely maps the real-world work of our subject pool. Future research should try to do the same in the context of mission motivation—to give subjects a mission that replicates the mission of their real-world work. This is challenging. For example, a reasonable conjecture is that health workers are motivated to help the individuals who come to them for assistance. One could therefore imagine an experimental design that allows some subjects to undertake a medical task that helps a physically present patient and one that allows them to undertake the same task, but for a remote patient. However, apart from the noise introduced by a heterogeneous patient population (we used the same actress in all our video vignettes), this design raises difficult logistical and ethical challenges.

A second goal of future research should be to design low-motivation tasks for laboratory experiments that map more naturally into the real-world tasks of actual organizations. This is again challenging, though for different reasons: repetitive tasks that are reasonably considered to be the least motivating are also most likely to be automated in a world in which machine learning and robotics are rapidly advancing.

Our results have implications for organizations seeking to utilize mission reinforcement to increase effort and productivity. We find that campaigns reinforcing organization missions are likely to yield positive impacts on effort among low-motivation tasks. Importantly, however, matching workers to tasks that motivate them seems more important for effort than mission matching. Future work can usefully focus on task motivation as a primary driver of intrinsic motivation, complementing the growing literature on mission and pro-social motivation.

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Appendix

Photos shown to subjects of children at the poor primary school (Gampela 3)

Appendix Table 1: Task and Mission Motivation, Controlling for Observables

Dependent variable: Effort (Number of rounds)			
	I	II	III
Task	Blank	Slider	Medical
Treatment: with Mission	1.391**	0.672*	-0.408
	(0.66)	(0.38)	(0.56)
Ability in slider task (piece rate)	--	-0.023	--
	--	(0.02)	--
Ability in medical task (piece rate)	--	--	-0.052
	--	--	(0.15)
Training: Midwife	0.437	-1.087	0.709
	(0.91)	(0.78)	(0.64)
Training: Doctor	-0.847	-1.092	-1.865
	(1.46)	(1.54)	(1.32)
Education level (years)	1.076	0.653	-1.099
	(0.82)	(1.09)	(0.77)
Female	-0.923**	-1.135*	-1.420
1 = Female	(0.45)	(0.64)	(0.90)
Age (years)	-0.031	0.007	-0.130**
	(0.05)	(0.07)	(0.05)
Current state of personal finances	-0.191	0.456	0.794
4 = Excellent	(0.53)	(0.44)	(0.75)
Risk preferences	-0.203	0.196	1.554***
5 = Risk seeking	(0.25)	(0.18)	(0.32)
Clarity of instructions	0.201	0.281**	1.106***
5 = Always clear	(0.31)	(0.14)	(0.32)
Confidence in payment to schools	-0.295	0.26	0.282
5 = Strongly Agree	(0.27)	(0.36)	(0.55)
Motivation (dictator)	0.001	-0.001	0.004
CFA donated to school	(0.00)	(0.00)	(0.00)
Constant	-0.231	-2.186	3.031
	(2.78)	(3.06)	(4.33)
Sigma			
Constant	2.410***	2.110***	4.764***
	(0.54)	(0.32)	(0.36)
Pseudo R2	0.055	0.040	0.037
Log Likelihood	-172.1	-175.4	-260.7
P	.	.	.
Observations	75	81	92
Right censored observations	1	0	8

Note: * p<0.1, ** p<0.05, *** p<0.01. Dependent variable is effort (number of rounds respondent chose to continue the task). Tobit specification with upper censors at 16 (the maximum rounds subjects continue prior to auto-exit), with clustered standard errors (by day) in parentheses. Table reports regression coefficients.