Development of a Motivation Scale in Rural Madagascar¹⁾: The Challenges of Psychometrics in Impoverished Populations of Developing Countries

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This series of studies initially aimed to develop a scale to measure the motivation, based on the self-determination theory, of rural farmers in Madagascar toward an agricultural training program. Considering the low rate of literacy, the Likert scales were designed to be administered orally. However, there were several unforeseen challenges in psychological measurement that hindered the development of the scales. Despite several revisions, responses to the questions lacked sufficient variance for the first four studies. The scale produced in the fifth study attained marginally satisfactory variance and internal consistency. The final version of the scale asked questions in the second person and measured the respondents' frequency of thoughts, instead of their degree of agreement with a first-person statement as is common in many scales. The possible reasons behind the lack of variance when answering in degrees are discussed. The challenges involved in the quantitative psychological measurement of impoverished populations, as well as considerations for future research in poverty contexts are also discussed.

Keywords: psychometrics, development aid, poverty, reflective ability, self-determination theory

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Introduction

In the field of development aid, which seeks to alleviate poverty and the difficulties associated with it, there is a growing interest towards psychology. For example, a recent edition of the *World Development Report* (World Bank, 2015), one of the most influential publications in the field, is subtitled *Mind, Society, and Behavior* and illustrates in detail how the understanding of the psychological factors of aid beneficiaries is important in making aid more effective. While the report cites several empirical studies that utilize psychological scales that have been translated from English into the local languages, most of the studies are published in economics journals, and the validity of the measurements seem questionable in many cases. For example, Laajaj et al. (2019) examined data of the Big Five Index (e.g., McCrae & Costa, 1997), which is frequently used in development economics research, from 23 low- and middle- income countries, and found that the reliability was low and factor structure was incongruent in most cases. There have been very few rigorous psychological studies that have been conducted with impoverished populations (Davis & Williams, 2020; Sayanagi, 2017; Sayanagi & Aikawa, 2016), and consequently there are no psychological measures that have been developed in the contexts of development aid or poverty.

This paper reports on a series of five studies conducted with the objective of developing a psychometric scale to measure the motivation of farmers participating in an agricultural training program in Madagascar. This scale was a necessary step in conducting research with the aim of identifying factors that would make the training more effective. The process of developing the scale

highlighted the challenges of psychological measurement with impoverished populations, many which were unforeseen as there were no studies that addressed the issue of psychometrics in such populations at the time this research was initiated.

Madagascar is one of the poorest countries in the world, with around 75% of the population estimated to live below the international poverty line of \$1.90 in 2019 (World Bank, 2020). As Ximenes, Cidade, & Silva (2019) point out, research in poverty contexts can be challenging for several reasons, including: “[the] lack of psychometric scales adapted to the poor population; the low level of education of those being researched...; and the lack of validation of scales for the [local] language,” among others. One of the challenges that the current study initially addressed was illiteracy. Madagascar has a relatively low literacy rate at 74.8% as of 2018 (UNESCO Institute of Statistics, n.d.), but the literacy among farmers targeted for this study was expected to be lower. Therefore, the measure was designed to be administered orally as a structured interview, a strategy that is commonly utilized in development economics studies as seen in part of the studies in Laajaj et al. (2019). However, there were further unforeseen challenges that hindered the development of the scale. These difficulties will be described in detail, and their implications on conducting psychological research on the extremely poor will be discussed.

Psychological literature on the poor

The majority of psychological studies on poverty have been conducted in the context of health and education, especially on the negative effects of poverty on developmental, cognitive, and educational outcomes and how to alleviate those negative effects. For example, an influential review

by Yoshikawa, Aber, & Beardslee (2012) concludes that poverty has a negative effect upon children's and youths' mental, emotional, and behavioral health and suggests strategies to mediate those effects. A longitudinal study by Shelleby et al. (2014) indicates that children's family incomes at age 2–3 indirectly but significantly predicted conduct problems and emotional problems at age 7–8. While studies such as Heckman, Pinto, & Savelyev (2013) and Reynolds, Ou, Mondì, & Giovanelli (2019) demonstrate that early childhood interventions are effective in alleviating poverty in later stages of life, few studies focus on shorter-term alleviation of poverty, for example through the identification of factors that could facilitate an adult's escape from poverty. Moreover, most studies have been conducted on the relatively poor in industrialized countries. Very few studies have been conducted on people who live below the international poverty line.

It is important to stress that many do not consider poverty to be caused by psychological factors such as deficient cultural or personality traits. An influential review and treatise by the Nobel Prize-winning economist Amartya Sen asserts that the structural lack of opportunity is a major cause (Sen, 1999). However, as Sayanagi (2017) argues, impoverished people often tend to have behavioral patterns that hinder their escape from poverty. Haushofer & Fehr (2014) review the effects of poverty and posit that decision-making under impoverished conditions hinder the alleviation of poverty. In sum, poverty may not be caused by psychological factors, but psychological states that occur under poverty work against the escape from poverty. Identifying these behavioral and psychological states through psychological research and defining strategies to work through

them could help to alleviate poverty.

Many programs in development aid aim to change the behavior of the beneficiaries so that they will adopt skills or techniques that will enable them to become more profitable: psychological theories on motivation would be suited for this purpose, and as Sayanagi (2017) has reviewed, self-determination theory (SDT: Ryan & Deci, 2017) and the theory of planned behavior (TPB: Ajzen, 1991), both theories on motivation, have been employed to some extent. However, there are still very few psychological studies, and research paradigms are yet to be established. There have been no psychological measures that have been developed in the context of extreme poverty, and as aforementioned, validity is often questionable when simply translating existing scales (Laajaj et al., 2019).

Self-determination theory

As discussed above, motivational theories would be a good fit for application in the field of development aid. SDT is a broad theory that encompasses not only motivation, but also basic psychological needs and well-being. The theory is known for highlighting the undermining effect (e.g., Deci, 1971; Lepper, Greene, & Nisbett, 1973), in which giving expected rewards diminishes intrinsic motivation and consequently decreases behavior after the rewards are withdrawn. A comprehensive meta-analysis by Deci, Koestner, and Ryan (1999) demonstrates that the undermining effect is robustly observed in industrialized nations.

While there are no academic reports on the undermining effect in extreme poverty, the authors have encountered several experts who agree that it is a problem in the field of development aid. In many aid projects, incentives are

used to encourage people to train in skills that would help them earn more money. However, in many cases once the project ends and incentives are discontinued, the participants cease doing what they have been trained. SDT could provide guidelines to prevent the undermining effect from occurring, for example by structuring programs so that beneficiaries are not solely motivated by incentives. Furthermore, Sayanagi (2017) proposes a theoretical framework based upon SDT on facilitating sustainable behavioral change.

There have been some SDT studies that have been conducted to samples that include impoverished people in Africa (e.g., Czaicki, Dow, Njau, & McCoy, 2018; van Egmond, Berges, Omarshah, & Benton, 2017). However, the measures used in these studies were translations of existing scales, and as will be seen later, there seem to be issues in measurement.

Organismic integration theory (OIT), a sub-theory of SDT, outlines a taxonomy of motivation (Ryan & Deci, 2017). There are two general types of motivation: intrinsic motivation, in which behavior is driven by internal states such as curiosity, interest, and enjoyment; and extrinsic motivation, in which behavior is enacted to meet external demands such as rewards or social acceptance. Extrinsic motivation has several categories that can be placed on a continuum that spans from controlled to autonomous. The most controlled type of motivation is *external regulation*, in which behavior is typically enacted to attain rewards or avoid punishment. Next on the continuum, *introjected regulation* is a relatively controlled type of motivation. Behavior is enacted to avoid feelings of guilt or shame, or to attain ego enhancement. A relatively autonomous type of motivation is *identified regulation*. Behavior is

enacted by a conscious endorsement of the value underlying the action. Sayanagi & Aikawa (2016) have proposed a further subdivision of identified regulation, self-oriented and other-oriented, speculating that outcomes would differ between the two. The most autonomous form of extrinsic motivation is *integrated regulation*, which occurs when the value of the behavior has been fully assimilated with the self. The current study endeavored to develop subscales for all of the above regulation types except for integrated because it rarely occurred in the Kenyan farmers surveyed by Sayanagi & Aikawa.

The studies in this paper endeavored to develop a psychological scale for motivation based on SDT. The issues that arose during the research and their implications are discussed.

The current research project

This series of studies was conducted as part of a larger research project which goal is to develop techniques that would improve rice production in Madagascar, and then to extend²⁾ those techniques to Sub-Saharan rice-producing countries. The authors are part of a team that is responsible for identifying psychosocial factors that lead to more effective extension of such techniques. The scale reported in this paper is one of the necessary steps in conducting this research and could be used in other development aid studies as well.

Overview of data collection

All data were collected on sites of a farmer training program that extends efficient rice-grow-

2) To “extend” agricultural techniques, or “agricultural extension,” is to introduce and educate new techniques to farmers. The current research project is developing new rice breeding materials that produce higher yields in the local soil, which is infertile, and also techniques for more effective fertilizer usage.

Table 1 Characteristics of survey respondents from each study

	<i>n</i> (M/F)	Cellphone owners	Age	Education	Cash deficit	Food deficit
			Average (SD) range	Ave years (SD) range	Ave mo. (SD) range	Ave mo. (SD) range
Study 1	24 (4/20)	6 (25%)	46.46 (12.29) 25–77	6.42 (3.01) 0–13	3.88 (3.17) 1–12	3.38 (3.38) 0–11
Study 2	54 (22/32)	27 (50%)	39.54 (11.76) 21–63	8.15 (3.69) 2–15	3.69 (2.27) 0–12	3.41 (2.67) 0–12
Study 3	31 (12/19)	7 (23%)	40.73 (13.55) 20–72	6.60 (2.39) 4–13	4.53 (2.97) 0–12	3.40 (2.16) 0–8
Study 4	105 (66/39)	30 (29%)	41.90 (14.73) 18–79	7.38 (3.51) 0–16	3.15 (2.29) 0–12	2.71 (2.24) 0–12
Study 5	24 (18/6)	12 (50%)	51.92 (11.20) 23–69	7.20 (2.78) 3–13	2.92 (1.53) 0–7	2.08 (1.26) 0–5

Notes. Cellphone ownership was verified by asking participants' phone numbers.

Number of months with cash and food deficits was measured by asking whether the participants had experienced any deficit for each of the past 12 months. Thus, this measure does not take into account the severity of the deficit: it could be just 1 day in the particular month, but it also could be the whole month; it could be a slight deficit, but also could be an extreme deficit.

ing techniques in several regions across Madagascar. The program, *Projet d'Amélioration de la Productivité Rizicole* (PAPRIZ) is jointly operated by the Madagascar Ministry of Agriculture, Livestock, and Fisheries (MAEP) and Japan International Cooperation Agency (JICA).³⁾ PAPRIZ was selected because its aims are similar to those of the current research project, and it can be regarded as a model case for extending rice-growing techniques to farmers in Madagascar.

Participants for the current studies were recruited as follows. First, candidate sites for the surveys were selected by the PAPRIZ headquarters. There were unique objectives for each survey, which were considered in selecting the sites. Also, the locations of the sites were taken into account so that the survey itineraries would be manage-

able. Farmers were recruited through local agents such as local government employees who oversaw the training and local farmers who had broad social networks. No cash or material stipends were distributed to the interviewees.

Characteristics of survey participants from each study are shown in Table 1. In addition to gender and age, statistics on cellphone ownership, education, and numbers of months within the past year with cash and food deficits are reported to illustrate the degree of poverty. According to the World Bank (n.d.), mobile cellular subscription rates in Madagascar were 40.57% in 2018, so apart from Study 2 and 5, the participants of this study had average or lower ownership rates within the country. Compulsory education is 8 years, but the average years of education exceeds 8 years in only Study 2. Most participants reported going short of cash and/or food within the past year. While the cash and food deficit measure does not necessarily reflect the severity of the deficit (see footnote of

3) The current research project was partially funded by JICA, but the research was conducted independently: i.e., there was no mandate or obligation to conduct a study on PAPRIZ.

Table 1), taken with the aforementioned indices, it can be reasonably assumed that a part of the participants are indeed extremely poor.

Apart from the scale reported in this paper, the surveys included questions on interviewees' farming, financial situation, and family members, among others. All interviews were conducted one farmer at a time. There were some sections of the survey in which one of the Japanese co-authors interviewed in English with one of the Malagasy co-authors interpreting, but most parts of the survey, including the scale reported in this paper, were conducted in Malagasy by one of the Malagasy co-authors.⁴⁾ While the time required for the scale reported in this paper generally was within 10 minutes per interviewee, times ranged between 30 minutes to 150 minutes for the complete survey package. The variance in interview times was mainly because the length of the survey section on farming varied and was especially shortened from Study 4.

Ethical considerations

All interviews were conducted in line with the Ethical Principles of Psychologists of the Japanese Psychological Association (n.d.). Informed consent was obtained, either in written form or by an audio recording. Special care was taken so that no interviewees were coerced into participating.

4) Some may wonder if conducting the questionnaire in groups, with the researcher reading the questions and respondents answering by marking circles on paper would be better, as it would be more efficient and be less prone to social desirability biases. However, the authors, who include researchers with extensive experience surveying Malagasy farmers, believe that such group sessions would not be viable because many of the farmers would not be able to easily understand the syntax of the questions. Indeed, questions often needed to be repeated or clarified during the interviews.

Mindful of the possibility that the local agent who recruited the farmers may have pressured some participants, interviewees were assured that they could discontinue the interview without consequence if they did not wish to talk. Also, as Narayan, Patel, Schaff, Rademacher, and Koch-Schulte (2000) state, in many cases participants hold the false hope that foreign researchers will give them a stipend for the day or provide material aid later (pp. 24–25). Interviewees were informed that there would be no such distributions, and that they were free to leave if they were not satisfied with the arrangement.

Study 1

Method

Development of items. The items were modeled after the self-regulation questionnaire (SRQ) paradigm widely used in SDT studies (the original SRQ was developed by Ryan & Connell, 1989). SRQ items typically state a reason for engaging in a target activity and ask the degree to which respondents agree. Items in this study were derived from Sayanagi & Aikawa (2016) where farmers in a comparable training project in Kenya gave reasons for their participation. The derived items were reviewed by the Malagasy co-authors to affirm their relevance in the context of Malagasy culture and farming.

Items were devised for internal, other-oriented identified, self-oriented identified, introjected, and external regulation. Two items for each regulation style were developed. The 10 items are shown in Table 2. Interviewees would answer on a 4-point Likert-like scale from “Do not agree at all” to “Strongly agree.” The items and answers were translated into Malagasy by the co-authors. The translation was verified through back-translation

Table 2 Items and descriptive statistics of motivation scale from Study 1 ($n=24$)

Item	Mean	SD
Internal regulation		
1. I participate because I enjoy the activities of PAPRIZ.	3.96	0.20
6. I participate because I feel PAPRIZ activities are interesting.	4.00	0.00
Other-oriented identified regulation		
2. I participate because I feel PAPRIZ activities will help improve our community.	4.00	0.00
7. I participate because I feel PAPRIZ will help my family.	4.00	0.00
Self-oriented identified regulation		
3. I participate because I feel that PAPRIZ will improve my skills as a farmer.	4.00	0.00
8. I participate because I feel that I can learn many things from PAPRIZ activities.	4.00	0.00
Introjected regulation		
4. I participate because I don't want to miss chances that other people will have.	3.92	0.28
9. I participate because I think PAPRIZ activities will help me get ahead of others.	4.00	0.00
External regulation		
5. I participate because I want to become rich.	4.00	0.00
10. I continue to participate because there are people that tell me I must.	1.00	0.00

by another Malagasy researcher who is not a co-author. In the interviews, the items were administered in the order that they are numbered in Table 2.

Participants. Twenty-four farmers participated in this study (see Table 1). The number of participants was small for this study because time was required to train the interviewers, especially on the extensive section on farming which is not reported in this paper, and procedures for contacting farmers were not established so thus it took more time to gain access to them.

Survey dates and location. This survey was conducted in the Vakinankaratra region of Madagascar in late August to early September of 2017.

Results and brief discussion

Descriptive statistics for all 10 items are shown in Table 2. Variance was zero for 8 of the items, and very small for the 2 other items. All 5 subscales were psychometrically unsuitable, as they cannot detect individual differences. One possible reason for the lack of variance is that the statements were too weak. However, the items might

have been difficult to understand, as interviewers reported instances in which items had to be repeated or explained.

Study 2

Method

Revision of items. Considering the possibility that the statements were too weak, the expressions of the items were made more extreme. For example, the clause “very much” was added to Item 1, “I participate because I enjoy the activities of PAPRIZ” (see Supplementary Table 1 for all items). Since the changes to the items were minor, there was no back-translation for this study. In the interviews, the items were administered in the order that they are numbered in Supplementary Table 1.

Participants. Fifty-four farmers participated in this study (see Table 1). This was a relatively affluent sample, with cellphone ownership rates higher than the national average, and average education exceeding the mandatory schooling of eight years. However, the average number of months in which participants experienced food

and cash deficits during the past year both exceeded 3 months, highlighting the level of poverty among rural farmers in Madagascar.

Survey dates and location. This survey was conducted in the Vakinankaratra region in February 2018.

Results and brief discussion

Descriptive statistics are shown in Supplementary Material Table 1. Distributions were still very skewed, and all 5 subscales were unsuitable. The interviewers observed that the respondents seemed to be confused because the items were first-person statements but were being read to them by a second person. Thus, the authors concluded that the reason for lack of variance was not that the statements were too weak, but because the respondents were not able to grasp the perspective of the statements. Additionally, the authors speculated that the respondents were having difficulty answering in degrees on the four-point Likert-like scale.

Study 3

Method

Revision of items and questioning method. Statements were changed from first person to second person (see Supplementary Material Table 2). Changes were minor, so there was no back-translation. Additionally, the method of questioning was altered. Items were presented as yes-no questions, and then for example if the respondent answered “yes,” they would be prompted, “Is that a strong yes or a weak yes?” “Strong no” was scored as 1 point, “weak no” 2 points, “weak yes” 3 points, and “strong yes” 4 points. In the interviews, the items were administered in the order that they are numbered in Supplementary Material Table 2.

Participants. Thirty-one farmers participated in this study (see Table 1). Cellphone ownership was lowest and average number of months with cash deficit was highest for this sample. This is thought to be the effect of the widespread flooding in the area during the past year due to cyclones.

Survey dates and location. This survey was also conducted in the Vakinankaratra region in late August to early September of 2018.

Results and brief discussion

Descriptive statistics for the 10 items are displayed in Supplementary Material Table 2. There was no apparent improvement in terms of increasing the variance of the responses, and none of the five subscales were suitable.

However, the interviewers reported that the participants seemed to understand better because there were fewer instances in which they needed to repeat the questions. Thus, one possibility that was considered as the cause for the lack of variance was that the reasons that farmers were participating in PAPRIZ were somewhat obvious, and the items would not be answered otherwise. The project taught participants to use seeds of improved varieties of rice and trained more effective planting and weeding techniques. Many farmers reported that the yield of their crops had increased by two to three times, while the amount of seeds required decreased. In other words, participation in PAPRIZ would clearly help their families (Item 7), improve their farming skills (Item 3), and help them get ahead of other farmers (Item 9). However, this line of thinking was deemed inconclusive as other items were not so obvious: PAPRIZ training and activities are not inherently fun or enjoyable (Item 1), and because the fields of the interviewees in this study were

relatively small, it would be unrealistic to think that one would get rich from just the farming techniques (Item 5).

Study 4

Method

Revision of items and questioning method.

Before revising the items, an alternative method of questioning was considered, namely, paired comparisons (Bradley & Terry, 1952). However, this method was not chosen because the scores obtained would be nonparametric and would greatly limit future research designs. Additionally, it would be difficult to evaluate the reliability and validity of the scale. Thus, the authors elected to continue development as a Likert-like scale.

Considering the possibility that the items used in the previous studies were over-sensitive to PAPRIZ participants, new items were added (see Supplementary Material Table 3). To address the issue of the lack of variance, a new method of questioning was introduced after approximately a quarter this study had been completed.

New items were based on farmer answers in Sayanagi & Aikawa (2016) and also the Treatment Self-Regulation Questionnaire (TSRQ: Williams, Grow, Freedman, Ryan, and Deci, 1996). The TSRQ was chosen because it included items regarding choice and life goals that are not included in other versions of the SRQ. While there were concerns that some of the statements were too abstract and difficult for the farmers to answer, the authors decided to use the items and observe respondents' reactions to assess their appropriateness. New items were not added for internal regulation and other-oriented identified regulation because the authors believed that the existing items already covered the breadth of the

concepts. The original items were retained to examine how the interviewees would respond to the new questioning method. All new items were translated from English to Malagasy by the co-authors and verified through back-translation by a Malagasy researcher who is not a co-author.

The new method was initially a “yes, no, or neutral” question, but because no farmers answered “neutral” after a number of trials, a modification was added. The question would be presented as a yes-no question, and when the respondent gave their answer, the interviewer would prompt “Do you really think so *all of the time*?” If the answer to the prompt was no, or if there was hesitation of approximately one second or more in answering yes, the answer would be treated as “neutral.” Approximately three quarters of the participants of this study were questioned with the modified method. The scoring scheme for this method was, a “no” would be scored as 1 point, “neutral” 2 points, and “yes” 3 points. In the interviews, the items were administered in the order that they are numbered in Supplementary Material Table 3.

Participants. A total of 105 farmers were interviewed for this study (Table 1). The number of participants increased because the larger survey in which this study was embedded substantially shortened its interview section on agriculture, allowing the survey team to interview more farmers. Also, the survey itinerary was longest of the five studies.

Survey dates and locations. Interviews were conducted in the Itasy and Analamanga regions of Madagascar in early March 2019.

Results and brief discussion

Descriptive statistics of all of the items are shown in Supplementary Material Table 3. There was no apparent difference between the partici-

pants who answered as a yes-neutral-no question and those with the new “do you think so all the time?” prompt, so the results are not reported separately. The distributions were very skewed, and the 5 subscales were still not fit for usage.

In regard to the method of questioning, the authors observed that while there was no increase in variance, it seemed easier for the interviewees to respond in terms of frequency (i.e., “do you think so all the time”) than in degree as in the first two studies (i.e., “how much do you agree with this statement”).

Study 5

Method

Revision of items and questioning method.

Items were revised so that they would ask how frequently they thought like each respective statement. This is a strategy that is sometimes used in

interview scales to younger children (e.g., Stocker & McHale, 1992). Respondents were asked “How often do you think this way?” to each respective item. Interviewees answered to a 4-point Likert-like scale: “never” was scored as 1 point, “only sometimes” 2 points, “most of the time” 3 points, and “all of the time” 4 points. In the interviews, the items were administered in the order that they are numbered in Table 3.

All of the items were reconsidered. Past items that were deemed as irrelevant or too abstract were omitted, but others that had a reasonable chance of being understood were retained and rephrased. Two new items (items 14 and 15) were proposed based upon farmer interviews that were conducted in a different part of this survey. The new items are presented in Table 3. All of the items were re-translated from English into Malagasy by the co-authors and verified through

Table 3 Items and descriptive statistics of motivation scale from Study 5 ($n=24$)

Item	Mean	SD
Internal PLOC ($\alpha=.64$)		
1. How often do you participate because you want to enjoy the activities of [the project]?	3.71	0.55
6. How often do you participate because [the project's] activities are interesting?	3.42	0.78
Other-oriented identified PLOC ($\alpha=.66$)		
2. How often do you participate because you want to help improve your community?	3.04	0.81
7. How often do you participate because you want to help your family?	3.17	0.76
15. How often do you participate because you want to help others?	3.08	0.83
Self-oriented identified PLOC ($\alpha=.55$: .63 for 3 & 8 only)		
3. How often do you participate because you want to you improve your skills as a farmer?	3.50	0.59
8. How often do you participate because you feel that you can learn from [the project's] activities?	3.00	0.78
13. How often do you participate in [the project's activities] because it's the best thing for you to do?	2.75	1.33
Introjected PLOC ($\alpha=.42$)		
4. How often do you feel that if you don't participate, you would miss chances that other people might have?	2.50	1.29
9. How often do you participate because [the project's] activities will help you get ahead of others?	3.17	0.82
12. How often do you participate in [the project's] activities because if you didn't, people would think you are not a good farmer?	1.67	0.92
External PLOC ($\alpha=.42$: .60 for 5 & 14 only)		
5. How often do you participate in [the project] because you want the project to make you rich?	2.71	1.20
10. How often do you participate in [the project's] activities because there are people that tell you that you must?	1.04	0.20
11. How often do you participate in [the project's] activities because other people would be unhappy if you didn't participate?	1.17	0.38
14. How often do you participate because you want to receive inputs from [the project]?	2.46	0.93

back-translation by a Malagasy researcher who is not a co-author.

Participants. Twenty-four farmers were interviewed in this study (Table 1). The number was small for this study because: 1) due to the objectives of the larger survey, sites that were struggling in collecting participants for PAPRIZ training were selected, thus there were fewer farmers to begin with; 2) the survey itinerary was short compared with past surveys; and 3) due to unexpected circumstances, recruiting of interviewees did not go as planned.

Survey dates and location. Interviews were conducted in the Vakinankaratra region in late August to early September 2019.

Results and brief discussion

Descriptive statistics are shown in Table 3. While the distributions of some items are still skewed, the skewedness was acceptable for most items, so Cronbach's alpha was computed for each of the 5 subscales. After deleting some items to improve internal consistency, 4 of the subscales reached tolerable levels, exceeding .60. Only the introjected regulation subscale was not satisfactory. Alpha coefficients are also reported in Table 3. Ultimately, the remaining items were all based upon farmers' interview statements.

General Discussion

A marginally satisfactory measure, which shall tentatively be named the SRQ for agricultural training in developing countries, has been put forward. Future studies should aim to improve the scale, especially the introjected regulation subscale that did not reach tolerable internal consistency. All final items are based on farmer responses and can be considered to have some degree of content validity. However, other aspects

of validity are yet to be confirmed. Especially, whether this method of asking the frequency of thinking of certain types of motivation validly reflects the strength of the motivation is still unclear and should be investigated in future studies. The scale could be tested with different training schemes by changing the project name in the items.

Apart from scale development, this series of studies sheds light on the challenges of conducting quantitative psychological studies with impoverished populations. These challenges are not just relevant to SDT studies such as this, but any studies that endeavor to quantitatively measure psychological constructs in such contexts.

First, the lack of variance in participants' responses to Likert-like scales indicate that traditional questioning methods may not be appropriate. Other studies conducted in the context of poor populations in Africa using translations of existing scales have also reported skewed distributions (Czaicki et al., 2018; van Egmond et al., 2017). In this study, what ultimately worked was a method that asked in second person instead of first person and the frequency of occurrence instead of degree of agreement. One possible reason that there was no variance in the responses for Studies 1–4 is the lack of *reflective ability* of the participants. In order to respond to an item in a psychometric scale adequately, one must be able to not only understand the superficial syntax, but also to reflect upon the statement's relevance to themselves. This would involve metacognition, a relatively high-order cognitive task. Additionally, thinking in degrees or in relative terms is considered a more abstract and complex cognitive task (Thomas, 1980, p. 461). It may be difficult for people who have had limited opportu-

nities for education to adequately reflect upon their degree of agreement. It may also be that living in poverty was a restraint on the respondents' cognitive capacities (see Dean, Schilibach, and Schofield, 2017; Haushofer & Fehr, 2014 for reviews).

Validation of the new scale and method will be challenging: there are no existing scales that can be validated against. Simply translating questionnaire measures that are used in industrialized nations may not result in accurate measurement, as previously discussed regarding the Big Five index (Laajaj et al., 2019) and SDT scales (Czaicki et al., 2018; van Egmond et al., 2017).

To address these issues it would be important that more research in the context of extreme poverty be conducted, and in doing so the establishment of ethical guidelines for conducting research in such contexts needs to be considered. While there are still few psychologists that conduct such research, interest is growing. For example, a former president of the American Psychological Association has called out for more psychologists to become involved (Davis & Williams, 2020). The JPA's ethical guidelines (n.d.) to which this study adhered has no explicit statements on researching impoverished subjects. While the authors of this study considered the guidelines to be satisfactory and that sufficient informed consent was obtained in these studies, there were some potential issues worth noting. First, as two of the authors/interviewers are foreigners, some interviewees may have held the false hope that they would be given something at the end of the interview. Indeed, a number of the interviewees asked for confirmation afterwards if there would really be no stipend, despite having been explicitly informed otherwise beforehand. It

should also be noted that farmers who held such false hopes might have shunned opportunities to earn cash through manual labor to participate in the interview, resulting in a financial loss to the already impoverished farmer. Second, as the PAPRIZ is a three-year training program, some farmers may have had the false hope that they were candidates to receive additional training after the scheduled end of the program. Third, while the authors made clear that they were independent from PAPRIZ and JICA and thus all interviews would be confidential, some interviewees may have suspected that their answers would be shared with the program staff, which is probable considering the tightly knitted communities of the farmers. These are not just ethical but also methodological issues, as they also may have biased the responses towards what the farmers perceived to be desirable to the interviewers.

Addressing these challenges is important for the field of psychology, as most contemporary theories claim to be universal despite the absence of evidence from impoverished populations in developing countries. Additionally, the advance of psychological research in these contexts could lead to the understanding of the psychological mechanisms behind extreme poverty and the identification of psychological factors that would alleviate poverty. While accessing impoverished populations in developing countries would also be a challenge, it would be possible if done in collaboration with aid agencies that already have a presence in the field. As aforementioned, there is demand for psychological perspectives in the field of development aid. Japan is one of the world leaders in official development assistance (Organization for Economic Co-operation and Development, 2020), and there are also numerous

Japanese non-government organizations that are active, so there are potential opportunities for Japanese researchers to get involved. Many other industrialized countries also have strong presences in development aid, and psychologists from such countries also could seek chances to enter the field. This would be an important contribution to not just the field of development aid but also society in general, and it is hoped that this paper will interest readers to join this worthy cause.

*Supplementary Material is available on J-Stage.

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