

MEASURING AUTONOMY: EVIDENCE FROM BANGLADESH

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The search for rigorous, transparent and domain-specific measures of empowerment that can be used for gender analysis is ongoing. This paper explores the added value of a new measure of domain-specific autonomy. This direct measure of motivational autonomy emanates from the “self-determination theory” (Ryan and Deci, 2000). We examine in detail the Relative Autonomy Index (RAI) for individuals, using data representative of Bangladeshi rural areas. Based on descriptive statistical analyses, we conclude that the measure and its scale perform broadly well in terms of conceptual validity and reliability. Based on an exploratory analysis of the determinants of autonomy of men and women in Bangladesh, we find that neither age, education nor income are suitable proxies for autonomy. This implies that the RAI adds new information about individuals, and as such, could represent a promising avenue for further empirical exploration as a quantitative, yet nuanced, measure of domain-specific empowerment.

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I. INTRODUCTION

Agency, and in particular women's agency, continues to have a prominent role in the development and poverty debate. For example, in *An Uncertain Glory: India and its Contradictions*, Jean Drèze and Amartya Sen call for further analyses to probe the links between women's agency and developmental outcomes in Bangladesh, suggesting that, to a great extent, transformations in "women's agency and gender relations account for the fact that Bangladesh has caught up with, and even overtaken, India in many crucial fields during the last twenty years" (Drèze and Sen, 2013, p. 61).

But, how do we probe links between women's agency and development outcomes in Bangladesh? Quantitative studies of agency, and its relationship to other variables, remain curtailed by the ongoing search for adequate indicators of women's empowerment within the household and other social institutions, in economic activities and in political space (Samman and Santos, 2009; Ibrahim and Alkire, 2007; Narayan, 2005; Alsop, Bertelsen and Holland, 2006; Malhotra, Schuler and Boender, 2002). At present, women's agency is most commonly measured through proxies such as education, employment, violence, ownership, control of assets such as land or housing, control over income and so on. This reliance on proxy measures has led to problems, especially when the proxies represent development outcomes that agency is understood to advance (Alkire, 2008). Other common indicators of women's empowerment for intrahousehold relations – decision-making in different domains, attitudes towards gender roles such as wife beating and exposure to information – also face challenges. For example, Kishor and Subaiya (2008) studied 23 different empowerment indicators, concluding there was no single adequate indicator of empowerment. They also found that policy-relevant determinants of empowerment differed across countries and regions within countries: "different facets of women's empowerment do not all relate in the same way to one another or to various explanatory variables" (Kishor and Subaiya, 2008, p. 201). Because gender norms are culture- and context-specific, the variation in the strength and significance of these relationships across countries should not be surprising. However, this does not negate the need for better indicators of women's agency.

This paper explores the added value of a direct measure of domain-specific autonomy in the context of Bangladesh. The rich literature on empowerment in Bangladesh enables us to more easily identify duplication and the added value of analyses more directly than in contexts which have not been subject to the same extent of qualitative and quantitative studies.

The measure under scrutiny in this paper is a domain-specific measure of motivational autonomy proposed by Ryan and Deci (2000), emanating from what is known as "self-determination theory": the Relative Autonomy Index (RAI). This measure of

autonomy is particularly suitable to the analysis of human development and poverty (Alkire, 2005; 2008). First, its definition is very similar to the one proposed by Sen's capability approach. Second, the self-determination theory approach is conceptually one of the most advanced psychological approaches to motivational autonomy and self-determination, and has been operationalized and validated across different nations (Chirkov, 2009; Chirkov, Ryan, and Sheldon, 2011). Third, it is flexible: the domains can be chosen to suit the particular analysis or poverty context. Fourth, the RAI does not replicate any existing measure of poverty, and as such, may facilitate analyses on the interaction between poverty and agency. Fifth, the measure empirically seeks to reflect individuals' own values, rather than fixing an external definition of autonomy or relying on purely subjective responses. Sixth, the measure appears to be cross-culturally comparable (and the assumption can be retested in the current study as well as future studies). Furthermore, the measure seems to frame autonomy in a way that is valued in individualistic and collectivist cultures alike – which is critically important as most indicators of agency are correlated with individualism (Chirkov and others, 2003). This is important in the case of Bangladesh, where concepts of agency and autonomy, which tend to be interpreted in terms of individual autonomy, need to be considered in light of Bangladeshi women deriving personal identity and satisfaction from relationships in which they are embedded.¹

Our analyses uncover new insights on the linkages between men's and women's autonomy and other development outcomes, such as income, education and occupation, as well as personal characteristics, such as age and household composition. The analyses also document the extent to which the autonomy indicator supplies new information that is not present in measures of household decision-making. While empowerment must be approached using multiple indicators and with a deep contextual understanding, it is possible that the RAI could prove to be a particularly useful tool for policy-relevant analyses.

As far as we know, the only other application of the RAI to measure women's autonomy based on data from a large-scale household survey in the context of a developing country was conducted by Vaz, Pratley and Alkire (2016). They found evidence that neither education nor income are reasonable proxies for women's motivational autonomy in Chad.

¹ Kathryn Yount, personal communication, 5 May 2014. This is consistent with findings from qualitative studies undertaken to supplement the pilot surveys of the Women's Empowerment in Agriculture Index. In Bangladesh, individuals cite a communal, rather than a singular, understanding of empowerment focused on the family unit rather than the individual woman or man—which includes the ability to work jointly and well together. Therefore, doing work and income-generating activities successfully empowers not just an individual but an entire family (Becker, 2012).

This paper proceeds as follows: section II presents the conceptual framework; section III introduces the data; section IV presents and discusses the conceptual validity and reliability of analyses; section V discusses the extent to which the Relative Autonomy Index adds information to the standard socioeconomic and demographic variables and decision-making indicators; section VI sets out conclusions.

II. CONCEPTUAL FRAMEWORK

The self-determination theory, developed by psychologists Richard Ryan, Ed Deci and others (Chirkov, Ryan, and Sheldon, 2011; Ryan and Deci, 2000; Deci and Ryan, 2012), distinguishes types of motivation by the degree to which they are self-determined rather than controlled. Human behaviour is driven by intrinsic and extrinsic motivations. Intrinsic motivation is associated with the enjoyment of the activity itself (for example, “I exercise because I really enjoy it”); while extrinsic motivation is the adoption of a behaviour in an instrumental way, in order to obtain an outcome aside from the behaviour itself (for example, “exercising to lose weight and/or improve health”). The self-determination theory differentiates among four types of extrinsic motivation, depending on the degree to which the individual self-endorses the behaviour: external, introjected, identified and integrated. External motivation occurs when there is effective coercion, by other people, or by force of circumstance (for example, “I must exercise otherwise my partner will be very upset with me”). Introjected motivation is when the individual acts to please others or to avoid blame (for example, “I exercise so that my friends don’t think badly of me”). Identified motivation occurs when a person’s behaviour reflects the valuing of self-selected goals and activities (for example, “I exercise because I think it is important for my health”). Integrated motivation occurs when a person’s actions reflect her own system of values, goals and identities, fully considered (for example, “I exercise because I see myself as a person who regularly exercises”). These types of extrinsic motivation reflect a self-determination continuum. External and introjected motivations are associated with relatively controlled behaviour, “in which one’s actions are experienced as controlled by forces that are phenomenally alien to the self, or that compel one to behave in specific ways regardless of one’s values or interests” (Chirkov and others, 2003). Identified and integrated motivations are associated with relatively autonomous behaviour, which is experienced willingly and is fully endorsed by the individual. Figure A.1, which summarizes the conceptual definitions of the self-determination continuum, is available in the online appendix.²

² The online appendix can be found at https://ophi.org.uk/wp-content/uploads/Vaz_et_al_2019_Online_Appendix.pdf.

Within this framework, the Relative Autonomy Index (RAI) measures the extent to which an individual's motivation for her behaviour in a specific domain is fairly autonomous as opposed to somewhat controlled. Thus, the RAI can be taken as a direct measure of the individual's ability to act on what she values. The RAI is computed with reference to a specific area of decision-making, and hence allows us to examine the variation of the individual's degree of autonomy across different aspects of her life.

The distinction between all types of motivations is not relevant in every context (Ryan and Connell, 1989; Levesque and others, 2007). In our analysis we combined the different forms of autonomous motivation (identified, integrated and intrinsic) into one single subscale. Thus, we use three subscales: external, introjected and autonomous motivation. The specific questions that we use to measure each subscale are based on the self-determination theory self-regulation questionnaires, and were revised through several field exercises (Alkire, 2005; Alkire and others, 2013). The questions ask individuals to rate each of three possible motivations for their actions in a specific domain, ranging from "never true" (lowest score, 1) to "always true" (highest score, 4). The wording of the survey questions is presented in table 1.

The RAI is the weighted sum of the person's scores in the three subscales. The subscales' weights are a function of their position in the self-determination continuum: -2 for external motivation, -1 for introjected motivation and +3 for autonomous motivation. The RAI, thus, varies between -9 and +9. The structure of the RAI is summarized in table 1. Positive scores are interpreted as indicating that the individual's motivation in that specific domain tends to be relatively autonomous, while negative scores indicate a relatively controlled motivation.

Table 1. Structure of the Relative Autonomy Index

Type of motivation	Survey question: Your actions with respect to [domain] are	Range / Scale	Weight
External	Motivated by a desire to avoid punishment or gain reward?	1 - 4 Never true - Always true	-2
Introjected	Motivated by a desire to avoid blame or so that other people speak well of you?	1 - 4 Never true - Always true	-1
Autonomous	Motivated by and reflect your own values and/or interests?	1 - 4 Never true - Always true	3

III. DATA

We relied on data from the Bangladesh Integrated Household Survey (BIHS), conducted from December 2011 to March 2012. The BIHS sample is nationally representative of rural Bangladesh and representative of rural areas of each of the seven administrative divisions within the country (Sraboni, Quisumbing, and Ahmed, 2013; Sraboni and others, 2013).

The BIHS questionnaires include a module specifically designed to collect data for computing the pilot Women's Empowerment in Agriculture Index (Alkire and others, 2013). This module includes autonomy questions providing the data to construct the Relative Autonomy Index. This module covers 13 decision-making domains (table 2).

The total sample size is 5,500 households, with information regarding both the self-identified primary male and female decision-makers in 4,566 of these households.³ However, as in each domain of decision-making, autonomy information was only provided by those respondents who actually make decisions in that domain, the relevant sample in each domain is smaller and varies across domains (table 2).

Table 2. Size of the sample with information to compute the Relative Autonomy Index

	Domain	Men	Women
a	Agricultural production	2 886	2 637
b	What inputs to buy for agricultural production	2 852	2 599
c	What types of crops to grow for agricultural production	2 853	2 620
d	Who would take crops to the market and when	2 664	2 489
e	Livestock raising	2 813	3 232
f	Non-farm business activity	2 224	1 607
g	Your own wage or salary employment	2 641	1 974
h	Minor household expenditures	4 506	5 168
i	What to do if you have a serious health problem	3 989	4 801
j	How to protect yourself from violence	1 663	1 525
k	Whether and how to express religious faith	3 850	3 839
l	What kind of tasks you will do on a particular day	4 268	5 063
m	Whether or not to use family planning to space or limit births	3 401	4 097

³ For 932 households we have information only for a female respondent (310 are single female headed households, 559 are married female headed households and 63 were male headed households), and for 5 households we have only information for the male respondent.

IV. CONCEPTUAL VALIDITY AND RELIABILITY

This section focuses on assessing how well the Relative Autonomy Index measures the autonomy of individuals.

Conceptual validity

Our first step will be to examine whether the data collected is consistent with the main hypotheses of our measurement model:

- (1) There are three dimensions in our autonomy data. Each of these dimensions reflects one of the latent constructs that we are attempting to measure: external, introjected and autonomous motivations.
- (2) There is an ordered correlation among the motivation subscales. As the subscales correspond to a continuum of autonomy, we expect that adjacent subscales correlate more strongly than those further apart on the continuum (Ryan and Connell, 1989).⁴

Dimensional structure

In this section we will examine the structure of the full set of motivation questions. We will investigate the feasibility of a three-dimensional structure, in which each dimension captures one of the latent characteristics that we are attempting to measure: external, introjected and autonomous motivations.

The main limitation of this approach in the current context is that it disregards the domain-specific nature of our autonomy measure. In other words, it assumes that questions about the same type of motivation, but referring to different areas of decision-making, load on a common factor. We believe that this assumption may be verified in the context of closely-related areas of decision-making.

Following Guio, Gordon and Marlier (2012), we analysed the structure of the data using three statistical methods: a factor analysis, a multiple correspondence analysis and a cluster analysis. The three methods led to similar conclusions, and here we discuss the confirmatory factor analysis. The results of the exploratory factor analysis, multiple correspondence analysis and cluster analysis can be found in the online appendix.

⁴ While the terminology might be interpreted to imply that identified motivation is negatively correlated with external and introjected motivations, the external and identified motivations are not necessarily negatively correlated, but are likely to have very low correlations since they are on the opposite extremes of the scale (Richard Ryan, personal communication, 29 June 2013).

We performed a confirmatory factor analysis (CFA) to investigate how well our measurement model fits the data. We considered a model with three latent constructs, each measured with four indicators, one for each area of decision-making related to agriculture – agriculture production, inputs to buy, crops to grow and who takes the crops to the market and when.⁵ The CFA model is displayed in figure 1.

The factor loadings⁶ of all items are very high, consistently above 0.75, and statistically significant at a 1 per cent level. The items with the lowest factor loadings are the ones aimed at capturing introjected motivation. The measure Standardized Root Mean Square Residual (SRMR), 0.015, suggests a good fit, as it is far below the threshold of 0.1, and the coefficient of determination suggests a perfect fit.⁷ We therefore conclude that CFA confirms our measurement model fits the data.

In order to examine the parameters' invariance across gender, we estimated the same model separately for men and women. The CFA models for the sample of women and men are displayed in the online appendix. The factor loadings in the models of men and women are very similar, although the ones for women tend to be slightly higher; and in the case of the items loading into the external motivation factor, the 95 per cent confidence intervals of men and women's estimates do not overlap. This implies that at least these parameters are statistically different for men and women at a significance level of 5 per cent. The biggest difference between the two models is in terms of the covariance between latent factors. In the sample of men, the factors external and introjected are strongly correlated, and they are both weakly correlated with the autonomous factor. In the sample of women, the highest correlation occurs between external and autonomous factors.⁸ If the external

⁵ We did not perform the confirmatory factor analysis with reference to all 13 domains, because only 636 individuals participated in decisions on all 13 domains. We focused on the agriculture-related domains because these were the ones that were more correlated.

⁶ Under our fully standardized and simple structure model, these factor loadings can be interpreted as correlation coefficients between each item and the corresponding latent factor (Abell, Springer, and Kamata, 2009).

⁷ Ignoring the survey design, we obtain a model with loadings, intercepts and variances almost identical to the ones displayed in figure 2. For this model Stata produces a larger range of acceptable fit indices and statistics. The chi-square statistic is significant, although this does not support a good fit; it is almost unavoidable given the size of the sample. The Root Mean Square Error of Approximation (RMSEA) and the lower and upper bounds of its 90 per cent confidence interval meet the standards for an acceptable fit. The Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) are above the threshold for an excellent fit.

⁸ Considering only the sampling weights (and ignoring the strata and the primary sampling units), we estimated the same model allowing all parameters except the measurement intercepts to vary across gender. Then, using Stata's command "estat ginvariant" (which is not available for estimations considering complex survey designs), we performed "score tests (Lagrange multiplier tests) and Wald tests of whether parameters constrained to be equal across groups should be relaxed and

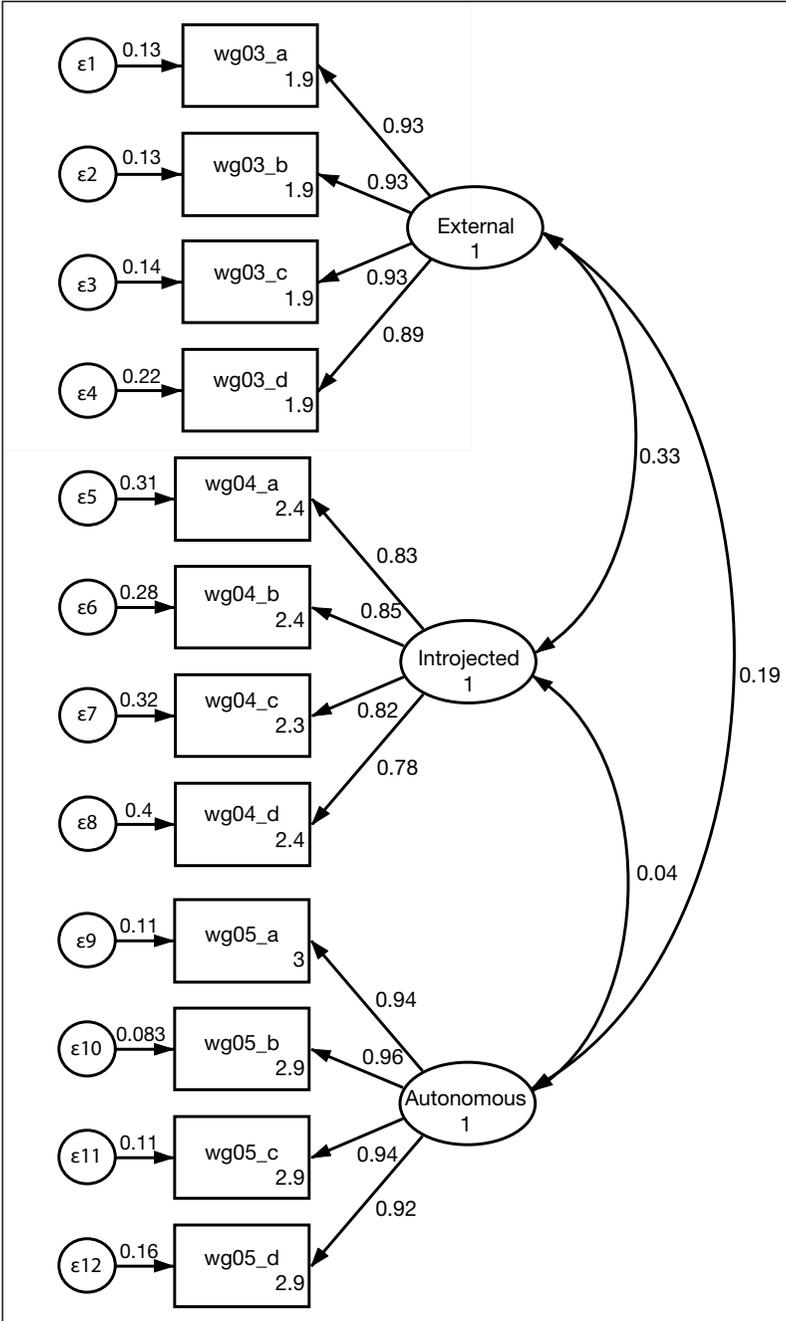
constraints for both genders reflect economic constraints, cultural hypotheses could be explored. To give a very basic example, male introjection could refer to social norms of being able to care for the family, and females' self-valuing of autonomous activities may be shaped by the extent to which these activities serve the family's needs. Obviously, this requires further exploration.

We also found no evidence that the items of our measurement model might be capturing different abilities across people of different ages, education levels or between employed and unemployed people.

This analysis suggests that there is a three-factor structure in the data, and that each question loads into the relevant factor. It also suggests that the measurement model might vary across gender. Finally, the correlations between the latent factors do not follow the ordered pattern hypothesized by the theory, especially in the sample of women. This feature requires further study. It may be that future research should explore discriminating between economic or "necessity-based" external motivations (gain economic reward, survive a serious health problem, prevent conception) and social external motivations (avoid punishment and coercion). The self-determination theory focuses more on social external motivations. Introjection clearly refers to milder social restrictions than punishment. However, if the external motivations relate to economic constraints and not to a higher intensity of external social restrictions, then the anticipated continuum may not hold. That possibility – which may have influenced women's responses in particular – is worth exploring, and for that reason we are not too troubled by the correlation patterns, as they clearly distinguish between the three factors.

whether parameters allowed to vary across groups could be constrained" (StataCorp, 2013). Looking at the joint tests for each parameter class, the null hypotheses that the measurement coefficients (chi-square of 45.862 and 9 degrees of freedom), the covariance of measurement errors (chi-square 75.212 with 12 degrees of freedom) and the covariance of exogenous variables (chi-square of 235.969 with 6 degrees of freedom) could be constrained across gender are rejected, and the null hypothesis that the measurement intercepts should be invariant across gender (chi-square 54.410 with 9 degrees of freedom) is also rejected. Looking at the single indicator tests, we find that the number of rejections is highest among parameters related with the variables that load into the external factor, which may suggest that men and women face different external constraints to their actions.

Figure 1. Confirmatory factor analysis model – all sample



Correlations within areas of decision-making

The subscales are expected to correspond to a continuum of autonomy. If they do, we expect contiguous subscales to correlate more strongly than subscales in opposite extremes. Thus, we expect the lowest correlation to occur between external and autonomous motivations. To investigate this assumption, we compute Spearman and Pearson correlation matrices for each domain, considering the samples of men and women separately.⁹ The matrices are presented in table A.2 in the online appendix.

We observe very distinct patterns of correlation for men and women. In the sample of men, we find that external and introjected motivations are strongly correlated in all domains, with the average correlations of 0.4 or 0.5; and both of these controlled forms of motivation correlate weakly with autonomous motivation (the absolute value of the correlation coefficients is below 0.08 in most domains).

In the sample of women, we find that external motivation is significantly correlated with both introjected and autonomous motivations, but the values are lower. In five domains related with economic activities – “agriculture production”, “what inputs to buy”, “what crops to grow”, “non-farming business activity” and “own wage and salaried employment” – external motivation is more correlated with autonomous than with introjected motivation. The correlations between external motivation and autonomy range from 0.16 to 0.25, except in the case of non-farm business, in which correlations rise to 0.33. The correlation between autonomy and introjection is only greater than 0.11 for the definition of daily tasks, where it is 0.138. A potential explanation for this pattern of correlation is that women in Bangladesh tend to internalize societal norms and “make them their own”; Bangladeshi women also derive personal value from their collective identity as members of a family (Becker, 2012). Another option is that women’s motivations in these domains are heavily controlled, even if they are also autonomous. For example, all productive activities may be primarily undertaken for (financial) reward, so external motivations will contribute to all of them. In such a case, the degree of women’s autonomy will be distinguished more by the strength of autonomous motivations than by low external motivations, because undoubtedly external motivations (in particular the need to work in order to obtain benefit) seem high. Qualitative study is required to probe this issue further. The divergence of the correlation patterns does raise questions about whether the weighted aggregation structure of the Relative Autonomy Index can be interpreted in the same way for men and women.

⁹ Spearman correlation coefficients do not take into account the survey design. The Pearson correlation coefficients displayed were computed pairwise and they do take into account the survey design.

4.2 Reliability

We test the internal consistency of motivation subscales using Cronbach's Alpha. This familiar coefficient reflects the extent to which a set of items measures a latent construct. Generally, in social sciences an Alpha above 0.7 is understood as "satisfactory", above 0.8 is seen as "good", and above 0.9 is considered "excellent".

We compute Cronbach's Alpha for each autonomy subscale, considering different areas of decision-making, which is similar to the approach adopted in the analysis of dimensional structure.¹⁰ We start by computing Alpha considering all areas of decision-making (13 items). As the number of items can artificially inflate Alpha (Cortina, 1993), we also calculate Alpha considering only the areas of decision-making related to agriculture (4 items), and considering only the domains not related to economic activities (6 items).

Table 3 shows that Cronbach's Alpha for external and identified motivation subscales are "excellent" in every case, ranging from 0.93 to 0.99. The introjected motivation has slightly lower Alphas, but they are "good" or "excellent" (always above 0.87) thus confirming the consistency of motivation scales.

Table 3. Cronbach's Alpha for different autonomy subscales, considering different sets of domains and different samples

	External motivation	Introjected motivation	Autonomous motivation	Number of observations
<i>All items</i>				
Sample of men	0.9552	0.9493	0.9866	365
Sample of women	0.9927	0.9066	0.9733	271
<i>Items related with agriculture</i>				
Sample of men	0.9278	0.8811	0.9693	2 608
Sample of women	0.9723	0.9019	0.9609	2 302
<i>Items not related with economics activities</i>				
Sample of men	0.9267	0.9011	0.9606	1 272
Sample of women	0.9623	0.8723	0.9519	1 104

¹⁰ Cronbach's Alpha is suitable to test the reliability of multiple-item scales. In our model, each autonomy subscale related to a specific area of decision-making is measured with only one question. Therefore, it is not possible to assess internal consistency of autonomy subscales within areas of decision-making.

We also performed an additional analysis of reliability using non-parametric item response theory, the Mokken Scale Procedure (Hemker, Sijtsma and Molenaar, 1995, p. 337). The results are presented in the online appendix, and broadly validate the reliability of the Relative Autonomy Index.

V. EXTERNAL VALIDITY

Our main hypothesis is that the autonomy indicators yield new and valuable information that is not contained in standard socioeconomic and demographic variables. If this is the case, its measurement and analysis could provide additional information. If not, a proxy variable may suffice for the same analysis. In this section we try to identify the determinants of autonomy and examine to what extent this concept is captured by other common proxies for empowerment, particularly decision-making.

The average RAIs for the different domains across different population subgroups are presented in the online appendix.

Correlations

In this section we examine the correlation between the relative autonomy indicators and a set of common proxies of empowerment. We start by looking at the correlations with indicators of general functioning: (i) an individual's education level, and (ii) the per capita expenditure quintile to which the household belongs. Then, we look at the relationship with general indicators of empowerment and agency. As general indicators of empowerment we use the ten-step ladder questions about a respondent's satisfaction with her power to make important decisions that change the course of her life, possibilities of going to other places outside her village, and her contact with friends or relatives. As general indicators of agency we used the indicator "ability to change things in the community"¹¹ and "influence in the community", based on a nine-step ladder question.¹² Finally, we look at correlations with the indicator of whether the individual feels she can make her own personal decisions in that specific domain,¹³ and the indicator of the individual's satisfaction with her decisions in that domain.

¹¹ The wording of the respective question is "Do you feel that a [man/woman] like yourself can generally change things in the community where you live if s/he wants to?". And the answer scale is: 1 "No, not at all"; 2 "Yes, but with a great deal of difficulty"; 3 "Yes, but with a little difficulty"; 4 "Yes, fairly easily"; 5 "Yes, very easily".

¹² The wording of the question is "please imagine a nine-step ladder, where on the bottom, the first step, stand people who have NO influence on the community, and step nine, the highest step, stand those who have influence in the community. On which step are you?"

¹³ We consider the definition used in the context of the Women's Empowerment in Agriculture Index: the indicator assumes a value of one if the individual makes the decisions, or feels she could make them to a medium extent if she wanted (Alkire and others, 2013).

Table 4. Pearson correlations between Relative Autonomy Index and other indicators

Relative Autonomy Index	General functioning			Empowerment			Agency			Domain-specific functionings	
	Education	Income	Power to make decisions	Mobility	Contact friends & relatives	Make changes in community	Influence in community	Feel make decisions	Satisfac-tion with decisions	(8)	(9)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		
Panel A: sample of men											
Agricultural production	0.02	0.18***	0.23***	0.26***	0.35***	0.03	0.08***	0.08**	0.39***		
Purchase inputs	0.04	0.17***	0.23***	0.27***	0.36***	0.03	0.08***	0.05	0.38***		
Decide on crops	0.03	0.16***	0.21***	0.25***	0.33***	0.03	0.08***	0.07**	0.40***		
Take crops to markets	0.03	0.16***	0.23***	0.26***	0.35***	0.04*	0.09***	0.07**	0.42***		
Livestock raising	0.03	0.18***	0.23***	0.24***	0.34***	0.05**	0.10***	0.09***	0.40***		
Non-farm activity	0.03	0.17***	0.24***	0.28***	0.34***	0.07***	0.13***	0.05*	0.43***		
Wage and employment	0.07***	0.17***	0.24***	0.24***	0.34***	0.04	0.07**	0.06**	0.49***		
Minor household expenditures	0.04**	0.13***	0.21***	0.23***	0.30***	0.03	0.05**	0.01	0.34***		
Health	0.01	0.14***	0.21***	0.25***	0.29***	0.08***	0.11***	0.03	0.41***		
Protection from violence	0.08***	0.26***	0.18***	0.19***	0.28***	0.24***	0.16***	-0.04	0.40***		
Religious faith	0.02	0.11***	0.11***	0.14***	0.15***	-0.04	0.02	0.03	0.26***		
Daily tasks	0.01	0.14***	0.16***	0.23***	0.31***	0.00	0.04*	0.08***	0.37***		
Family planning	0.01	0.08***	0.19***	0.24***	0.25***	0.03	0.04	0.11***	0.26***		

Relative Autonomy Index	General functioning			Empowerment			Agency			Domain-specific functionings	
	Education	Income	Power to make decisions	Mobility	Contact friends & relatives	Make changes in community	Influence in community	Feel make decisions	Satisfac- tion with decisions	(8)	(9)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(8)	(9)
Panel B: sample of women											
Agricultural production	0.05**	0.07**	0.18***	0.15***	0.14***	0.08**	0.10***	0.07**	0.28***	0.07**	0.28***
Purchase inputs	0.05**	0.09***	0.20***	0.18***	0.17***	0.07**	0.12***	0.08***	0.30***	0.08***	0.30***
Decide on crops	0.06**	0.08***	0.19***	0.15***	0.15***	0.07**	0.11***	0.08***	0.30***	0.08***	0.30***
Take crops to markets	0.05*	0.10***	0.20***	0.15***	0.17***	0.08**	0.11***	0.09***	0.30***	0.09***	0.30***
Livestock raising	0.01	0.07***	0.13***	0.09***	0.10***	0.07**	0.11***	0.10***	0.33***	0.10***	0.33***
Non-farm activity	0.06*	0.12***	0.15***	0.15***	0.13***	0.08*	0.10**	0.10***	0.32***	0.10***	0.32***
Wage and employment	0.04	0.05	0.10***	0.11***	0.11***	-0.01	0.03	0.04	0.30***	0.04	0.30***
Minor household expenditures	0.02	0.05**	0.14***	0.10***	0.08***	0.04	0.08***	0.07***	0.33***	0.07***	0.33***
Health	0.02	0.06**	0.15***	0.12***	0.11***	0.05*	0.10***	0.03	0.32***	0.03	0.32***
Protection from violence	0.08**	0.03	0.11**	0.09*	0.18***	-0.03	-0.02	0.11***	0.37***	0.11***	0.37***
Religious faith	0.06**	0.09***	0.09**	0.07**	0.03	0.07**	0.06**	0.04	0.33***	0.04	0.33***
Daily tasks	0.02	0.09***	0.09***	0.07***	0.07***	0.06**	0.07***	0.08***	0.30***	0.07***	0.30***
Family planning	0.04**	0.06**	0.12***	0.07***	0.06**	0.06**	0.12***	0.01	0.33***	0.01	0.33***

Note: ***p<0.01, **p<0.05, *p<0.1".

We examine the Pearson correlation coefficients, which allow us to account for the survey design (table 4). We report the Spearman and Kendall tau rank correlation coefficients in the online appendix. Contrary to what is commonly assumed, we find that autonomy is not highly correlated with education – although the coefficient is significant in some domains, it never goes beyond 0.08. Autonomy is also not strongly correlated with expenditure quintile. Although the correlation coefficient is almost always statistically significant, the magnitude is relatively small. The correlation between autonomy and income is consistently higher among men (average of 0.16 across domains) than among women (average of 0.07).

The three indicators of empowerment are correlated with autonomy in practically all domains. Again, the magnitude of this correlation is, on average, higher in the sample of men than in the sample of women – and again, the correlation levels are modest. This time, correlation levels for men between autonomy and empowerment reach 0.24 for decision-making; 0.28 for mobility; and 0.35 for contact friends and relatives. Women’s correlations are lower and more uniform across the empowerment indicators, and never above 0.20. The correlations with the indicators of agency are generally relatively weak and not significant in all domains.

We find that the RAI and satisfaction with decisions made are slightly more strongly correlated: the average correlation coefficient across domains is 0.38 for men and 0.32 for women. This means that, on average, individuals with higher autonomy are more satisfied with their decisions; however, the level of correlation is still relatively low.

On the other hand, the question of whether the respondent either makes a decision in the domain or feels she could make a decision if she wished – which is an improvement on the standard decision-making questions that are often used to proxy empowerment – has low correlations for both men and women across all domains. In all but two cases correlations are 0.1 or under.

In summary, the two indicators that are slightly more correlated with individuals’ relative autonomy, consistently across gender, are the domain-specific indicator of satisfaction with decisions made and the general indicator of satisfaction with “power to make important decisions that change one’s course of life”, but even these correlation values are relatively low.

Regression analysis

The correlation analysis provides only a rudimentary view of the relationship between different indicators, as it ignores both interactions between variables and non-linear relations. We use regression analysis to examine more formally the relationship between autonomy and other individual and household characteristics, and to investigate the extent to which other indicators could be used as proxies for individual relative autonomy in Bangladesh.

5.2.1 Empirical specification

We start by estimating the following equation:

$$RAI_{ij} = \beta_0 + \beta_1 X_i + \beta_2 F_i + \beta_3 H_i + \varepsilon_i \quad (1)$$

where RAI_{ij} is individual i 's Relative Autonomy Index in domain j , X_i is a vector of individual and household demographic characteristics (e.g. age, marital status, and number of household members), F_i is a vector of indicators of an individual's general functionings (e.g. years of schooling), H_i is a vector of indicators of housing quality and assets (e.g. improved sanitation, access to drinking water, ownership of assets), and ε_i is the error term. A list of the covariates and the respective descriptive statistics are included in the online appendix.

In a second round of regressions we include an additional set of explanatory variables, Z_i (potential proxies for the RAI), to see how these are associated with autonomy, after we control for the individual and household's characteristics.

$$RAI_{ij} = \beta_0 + \beta_1 X_i + \beta_2 F_i + \beta_3 H_i + \beta_4 Z_i + \varepsilon_i \quad (2)$$

The summary statistics of all the variables used are presented in table A.3 in the online appendix.

The equations are estimated using a linear model,¹⁴ separately for men and women,¹⁵ and taking account of the complex survey design. Division dummies are included in all regressions to control for location specific effects.¹⁶

Results

Estimates of equation (1) for the Relative Autonomy Index (RAI) in domains of "agriculture production", "livestock raising", "non-farm business" and "protection from violence" are presented in table 5. We selected these domains because they cover a broad spectrum of activities (including the main occupation of men and women in the sample) and allow us to illustrate our main conclusions.

¹⁴ The Relative Autonomy Index is a Likert Scale. So, it can be analysed as an interval scale (Allen and Seaman, 2007; Brown, 2011; Carifio and Perla, 2007).

¹⁵ Otherwise, as there is a male and female from each household, the errors are likely to be correlated.

¹⁶ We also estimated the equations using an ordered probit model, as a robustness check. The conclusions did not change. These estimates are included in the online appendix.

Table 5. Estimates of equation (1) using a linear regression model

Variables	Domains							
	Agriculture production		Livestock raising		Non-farming business activity		Protection from violence	
	Men (1)	Women (2)	Men (3)	Women (4)	Men (5)	Women (6)	Men (7)	Women (8)
Age	0.008 (0.006)	0.007 (0.009)	0.009 (0.006)	0.001 (0.008)	-0.002 (0.008)	-0.001 (0.011)	0.001 (0.007)	0.013 (0.010)
Household head	0.205 (0.562)	0.070 (0.269)	-0.153 (0.470)	0.082 (0.245)	0.754 (0.545)	0.484 (0.398)	0.306 (0.561)	0.761*** (0.225)
Number of household members	0.096** (0.048)	0.026 (0.054)	0.057 (0.057)	-0.084 (0.056)	0.174*** (0.052)	0.033 (0.074)	0.093 (0.061)	-0.033 (0.066)
Number of members <6	0.198* (0.111)	0.196 (0.122)	0.262** (0.117)	0.114 (0.119)	-0.100 (0.129)	-0.416*** (0.130)	0.007 (0.140)	0.248 (0.151)
Years of education	-0.021 (0.020)	0.023 (0.026)	-0.038* (0.022)	-0.013 (0.024)	-0.038 (0.024)	0.008 (0.032)	-0.000 (0.021)	0.072** (0.030)
Occupation in agriculture	0.287 (0.596)	-0.719*** (0.185)	-0.033 (0.648)	-0.554*** (0.167)	0.651 (0.666)	-0.355* (0.211)	-0.227 (0.754)	-0.561*** (0.222)
Sanitation	-0.539*** (0.192)	0.348* (0.186)	-0.258 (0.228)	0.460** (0.195)	-0.154 (0.236)	0.283 (0.232)	-1.053*** (0.289)	0.476* (0.245)
Cooking fuel	-1.054** (0.456)	-0.630 (0.422)	-0.087 (0.485)	-0.210 (0.398)	-1.161** (0.558)	-0.139 (0.578)	-0.417 (0.537)	-0.855 (0.547)
Assets - access to information	0.411** (0.191)	0.235 (0.209)	0.120 (0.201)	0.141 (0.188)	0.319 (0.200)	0.520** (0.248)	0.036 (0.189)	0.181 (0.240)
Assets - support to mobility	0.125 (0.155)	-0.176 (0.155)	0.148 (0.168)	0.045 (0.159)	-0.001 (0.175)	0.453** (0.193)	-0.039 (0.165)	0.389* (0.220)

Variables	Domains							
	Agriculture production		Livestock raising		Non-farming business activity		Protection from violence	
	Men (1)	Women (2)	Men (3)	Women (4)	Men (5)	Women (6)	Men (7)	Women (8)
Assets - support to livelihood	0.230 (0.173)	0.169 (0.166)	0.658*** (0.241)	0.768*** (0.206)	-0.029 (0.177)	0.087 (0.208)	-0.145 (0.200)	0.400* (0.221)
Household expenditure per capita	0.340*** (0.064)	0.028 (0.066)	0.323*** (0.071)	-0.025 (0.067)	0.306*** (0.069)	-0.013 (0.084)	0.471*** (0.082)	-0.174** (0.075)
Barisal	-1.219** (0.580)	0.506 (0.827)	-1.124** (0.570)	-3.060*** (0.690)	-1.806*** (0.610)	0.500 (0.945)	-1.355** (0.528)	0.660 (0.573)
Chittagong	-0.054 (0.511)	-1.210*** (0.395)	0.159 (0.516)	-1.786*** (0.461)	0.029 (0.450)	-1.283** (0.531)	-0.235 (0.620)	-2.507*** (0.431)
Khulna	1.210*** (0.385)	1.023*** (0.354)	1.429*** (0.381)	0.130 (0.342)	1.480*** (0.386)	1.374*** (0.448)	0.428 (0.407)	-0.146 (0.431)
Rajshahi	-1.775*** (0.481)	-0.768 (0.638)	-1.856*** (0.503)	-2.231*** (0.601)	-2.542*** (0.501)	-1.295* (0.702)	-3.420*** (0.409)	-1.342* (0.740)
Rangpur	-2.696*** (0.375)	-1.333*** (0.358)	-2.274*** (0.452)	-2.460*** (0.354)	-2.969*** (0.419)	-2.013*** (0.432)	-3.206*** (0.378)	-3.348*** (0.335)
Sylhet	0.045 (0.411)	-0.994** (0.504)	0.135 (0.390)	-1.237** (0.546)	-0.375 (0.429)	-1.471** (0.655)	-2.178*** (0.569)	0.430 (0.431)
Constant	2.201*** (0.528)	3.642*** (0.680)	2.092*** (0.656)	4.837*** (0.627)	3.293*** (0.618)	3.643*** (1.179)	1.689** (0.721)	4.932*** (0.738)
F-statistic	12.9***	5.7***	8.0***	7.1***	9.8***	9.3***	19.2***	14.9***
R-squared	0.177	0.078	0.165	0.131	0.205	0.132	0.260	0.201
Number of observations	2 882	2 636	2 809	3 231	2 222	1 607	1 660	1 524

Note: The table does not include the estimates of explanatory variables that are not significant in any of the regressions presented, namely: occupation of household head, nutrition and drinking water. *** p<0.01, ** p<0.05, * p<0.1.

Three general features become apparent when we look at these tables. First, men's and women's relative autonomy seems to be determined by different factors. Second, geographical location, which may proxy different cultural norms in each of Bangladesh's divisions, affects the autonomy of both men and women. Third, the factors that determine relative autonomy vary across domains of decision-making.

Differences across gender. Men's autonomy is positively associated with income. The coefficient of the quintile of per capita expenditure is significant in all regressions of men's RAI. On the other hand, this coefficient is not significant in any of the regressions of women's RAI, except in "protection from violence", where the coefficient is negative. However, the negative sign on protection from violence may highlight the possibility that domestic violence (which is the likely form of violence to which women are more exposed in Bangladesh) does not decrease with income.

Women's relative autonomy, on the other hand, is associated with their occupation and sector of work. The results suggest that women engaged in activities related to agriculture tend to have lower levels of autonomy than women engaged in other activities. This relationship is significant at the 1 per cent level in all domains, except "non-farming business activity". The occupation of most women in rural Bangladesh is either livestock/poultry raising (50 per cent of the sample) – here classified as related to agriculture – or housewife (42 per cent). Housewives thus appear to have higher autonomy than other women, possibly because they may have greater decision-making power within the domestic sphere, compared to agriculture where men typically make most of the decisions.

Less important, but intriguing, we find that sanitation tends to be negatively associated with men's autonomy, but positively associated with women's RAI. It is possible that having better sanitation facilities on one's homestead reduces women's vulnerability in terms of having to use facilities outside, but this effect does not hold for men.¹⁷ Another possible explanation is that improved sanitation might reduce the number of illness episodes in the household and be associated with easier access to water, thereby reducing women's unpaid care and domestic work.

Geographical location. The high significance of the location dummies suggests that, after controlling for income distribution, basic housing conditions and individuals' characteristics, there are (unobservable) local factors that have a strong effect on individuals' autonomy. However, as location dummies capture differences in social norms and economic conditions that may have offsetting effects, these coefficients need to be interpreted carefully.

¹⁷ Indeed, in some parts of South Asia, a husband's assurance that the home to which a bride is moving has its own toilet has become a condition for marriage.

Determinants of autonomy in specific domains. The pattern of determinants of women's autonomy in the domain of "protection from violence" is particularly interesting. Women's education is not significantly associated with autonomy in any other domain. This is an important result, given the high rates of intimate partner violence in Bangladesh: increasing women's education thus continues to be an important policy priority for women's overall empowerment and welfare.¹⁸ Being the household head is also associated with women's autonomy only in this domain, possibly because being a female head of household often results from widowhood or divorce, and implies the absence of a husband and in-laws who might perpetuate domestic violence.

It is noteworthy that ownership of specific assets affects women's autonomy in different domains. For instance, assets related to access to information and support to mobility seem to have a positive impact on women's autonomy in the domain of "non-farming business activity". Assets to support livelihoods also have a positive impact on women's autonomy in protection from violence, which is consistent with findings from India that asset ownership protects against domestic violence (Panda and Agarwal, 2005). In contrast to income, assets, particularly those related to information, mobility and livelihood, thus appear to have a positive impact on women's autonomy. These results are potentially relevant to programmes that seek to increase women's control of assets.

The set of variables that are significantly correlated with the Relative Autonomy Index varies across domains. This evidence supports the hypothesis that autonomy is domain-specific and, therefore, it should be measured separately in different domains.

The analysis above has shown that neither age, education nor income are suitable proxies for relative autonomy of men and women. Now we investigate if the indicators on decision-making are valid candidates.

¹⁸ Unfortunately, we do not have information on the "forms" that violence takes. For instance, withdrawal of financial support and physical abuse are very distinct forms of violence and most likely have different implications for autonomy.

Table 6.1. Estimates of equation (2) using linear model – sample of men

Variables	Domains								
	Agriculture production			Non-farming business activity			Protection from violence		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age	0.009 (0.006)	0.009 (0.006)	0.008 (0.006)	-0.001 (0.008)	0.003 (0.007)	-0.001 (0.007)	0.002 (0.007)	0.003 (0.007)	0.002 (0.007)
Household head	-0.005 (0.559)	-0.037 (0.538)	0.005 (0.560)	0.684 (0.550)	0.453 (0.485)	0.688 (0.561)	0.317 (0.558)	0.094 (0.587)	0.393 (0.558)
Number of household members	0.100** (0.048)	0.043 (0.049)	0.080* (0.048)	0.176*** (0.052)	0.131*** (0.047)	0.156*** (0.053)	0.092 (0.061)	0.078 (0.055)	0.078 (0.059)
Number of members <6	0.197* (0.112)	0.185* (0.105)	0.197* (0.110)	-0.100 (0.129)	-0.111 (0.128)	-0.083 (0.128)	0.005 (0.140)	0.011 (0.126)	0.017 (0.141)
Years of education	-0.022 (0.020)	-0.021 (0.018)	-0.032* (0.019)	-0.038 (0.024)	-0.026 (0.021)	-0.045* (0.023)	0.000 (0.021)	0.002 (0.021)	-0.005 (0.021)
Occupation in agriculture	0.186 (0.589)	0.304 (0.563)	0.277 (0.576)	0.666 (0.679)	0.420 (0.588)	0.829 (0.688)	-0.224 (0.756)	-0.262 (0.736)	-0.276 (0.760)
Sanitation	-0.547*** (0.192)	-0.533*** (0.184)	-0.615*** (0.191)	-0.153 (0.237)	-0.384* (0.222)	-0.243 (0.233)	-1.054*** (0.289)	-1.046*** (0.280)	-1.104*** (0.285)
Cooking fuel	-1.049*** (0.456)	-1.020*** (0.462)	-0.993*** (0.443)	-1.153** (0.556)	-0.916* (0.532)	-1.079** (0.547)	-0.424 (0.539)	-0.459 (0.511)	-0.409 (0.562)
Assets - access to information	0.421** (0.191)	0.399** (0.187)	0.393** (0.189)	0.313 (0.199)	0.233 (0.194)	0.278 (0.198)	0.036 (0.189)	0.033 (0.190)	0.034 (0.187)
Assets - support to mobility	0.105 (0.156)	0.072 (0.149)	0.073 (0.151)	-0.008 (0.176)	-0.129 (0.161)	-0.016 (0.171)	-0.038 (0.165)	-0.130 (0.162)	-0.059 (0.163)
Assets - support to livelihood	0.234 (0.172)	0.217 (0.155)	0.219 (0.169)	-0.024 (0.177)	-0.005 (0.158)	-0.090 (0.172)	-0.143 (0.200)	-0.216 (0.193)	-0.183 (0.198)

Variables	Domains								
	Agriculture production			Non-farming business activity			Protection from violence		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Household expenditure per capita	0.341*** (0.064)	0.228*** (0.061)	0.296*** (0.062)	0.302*** (0.070)	0.202*** (0.064)	0.257*** (0.070)	0.469*** (0.081)	0.420*** (0.078)	0.445*** (0.080)
Barisal	-1.262** (0.581)	-1.476*** (0.563)	-1.304** (0.544)	-1.826*** (0.612)	-2.076*** (0.604)	-1.902*** (0.564)	-1.346** (0.534)	-1.552*** (0.537)	-1.399*** (0.517)
Chittagong	-0.100 (0.512)	-0.057 (0.465)	-0.087 (0.501)	0.006 (0.452)	0.003 (0.401)	-0.005 (0.444)	-0.232 (0.621)	-0.273 (0.570)	-0.151 (0.620)
Khulna	1.204*** (0.388)	0.971** (0.388)	1.059*** (0.376)	1.470*** (0.387)	1.101*** (0.370)	1.332*** (0.375)	0.424 (0.407)	0.472 (0.398)	0.399 (0.406)
Rajshahi	-1.708*** (0.469)	-0.938** (0.444)	-1.546*** (0.461)	-2.540*** (0.502)	-1.755*** (0.452)	-2.323*** (0.493)	-3.423*** (0.404)	-2.744*** (0.400)	-3.313*** (0.411)
Rangpur	-2.698*** (0.373)	-2.263*** (0.355)	-2.457*** (0.390)	-2.959*** (0.421)	-2.223*** (0.368)	-2.716*** (0.431)	-3.204*** (0.378)	-2.508*** (0.377)	-3.100*** (0.385)
Sylhet	0.027 (0.408)	0.172 (0.365)	0.351 (0.397)	-0.398 (0.428)	-0.266 (0.374)	0.003 (0.433)	-2.179*** (0.568)	-1.475*** (0.535)	-1.904*** (0.580)
Feel can make decisions	0.659** (0.282)	0.391 (0.297)	0.592** (0.282)	0.342 (0.290)	0.234 (0.264)	0.296 (0.280)	-0.059 (0.237)	-0.104 (0.230)	-0.072 (0.238)
Satisfaction with decisions	-	1.096*** (0.124)	-	-	1.293*** (0.128)	-	-	0.949*** (0.147)	-
Power to make decisions	-	-	0.247*** (0.046)	-	-	0.284*** (0.051)	-	-	0.146** (0.061)
Constant	1.791*** (0.541)	-1.991*** (0.698)	0.608 (0.572)	3.069*** (0.638)	-2.063*** (0.745)	1.608** (0.675)	1.726** (0.710)	-1.799** (0.817)	0.921 (0.764)

Variables	Domains								
	Agriculture production			Non-farming business activity			Protection from violence		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
F-statistic	13.06***	17.05***	13.60***	9.42***	21.53***	12.43***	18.67***	24.41***	18.10***
R-squared	0.180	0.248	0.199	0.205	0.288	0.227	0.260	0.309	0.266
Number of observations	2 882	2 876	2 882	2 222	2 215	2 222	1 660	1 643	1 660

Note: The table does not include the estimates of explanatory variables that are not significant in any of the regressions presented, namely: occupation of household head, nutrition and drinking water. *** p<0.01, ** p<0.05, * p<0.1.

Table 6.2. Estimates of equation (2) using linear model – sample of women

Variables	Domains								
	Agriculture production			Non-farming business activity			Protection from violence		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age	0.007 (0.009)	0.000 (0.008)	0.003 (0.008)	-0.000 (0.010)	-0.002 (0.010)	-0.003 (0.010)	0.013 (0.010)	0.006 (0.010)	0.010 (0.010)
Household head	-0.033 (0.274)	-0.117 (0.276)	-0.057 (0.277)	0.394 (0.402)	0.321 (0.419)	0.372 (0.412)	0.733*** (0.221)	0.678*** (0.234)	0.714*** (0.226)
Number of household members	0.020 (0.054)	0.021 (0.050)	0.021 (0.053)	0.030 (0.074)	0.012 (0.068)	0.023 (0.075)	-0.035 (0.065)	-0.079 (0.061)	-0.039 (0.067)
Number of members <6	0.204* (0.122)	0.194 (0.116)	*0.145 (0.117)	-0.409*** (0.130)	-0.379*** (0.131)	-0.431*** (0.131)	0.255* (0.150)	0.226 (0.152)	0.233 (0.145)
Years of education	0.022 (0.026)	0.011 (0.025)	0.014 (0.025)	0.010 (0.032)	-0.018 (0.033)	0.006 (0.031)	0.071** (0.030)	0.061** (0.031)	0.066** (0.029)
Occupation in agriculture	-0.730*** (0.185)	-0.787*** (0.182)	-0.657*** (0.183)	-0.366* (0.210)	-0.407* (0.209)	-0.342* (0.206)	-0.568** (0.222)	-0.517** (0.217)	-0.572** (0.222)
Sanitation	0.356* (0.186)	0.222 (0.181)	0.309 (0.188)	0.305 (0.234)	0.271 (0.235)	0.272 (0.232)	0.478* (0.246)	0.386 (0.249)	0.463* (0.243)
Cooking fuel	-0.645 (0.420)	-0.451 (0.376)	-0.652 (0.423)	-0.169 (0.576)	0.160 (0.537)	-0.198 (0.566)	-0.850 (0.546)	-0.548 (0.502)	-0.848 (0.550)
Assets - access to information	0.242 (0.208)	0.097 (0.210)	0.215 (0.204)	0.498** (0.246)	0.472* (0.245)	0.505** (0.240)	0.181 (0.240)	0.103 (0.239)	0.169 (0.241)
Assets - support to mobility	-0.166 (0.156)	-0.256* (0.148)	-0.136 (0.151)	0.458** (0.192)	0.257 (0.192)	0.439** (0.188)	0.397* (0.222)	0.366* (0.209)	0.422* (0.219)
Assets - support to livelihood	0.168 (0.165)	0.073 (0.159)	0.154 (0.161)	0.069 (0.207)	0.070 (0.212)	0.025 (0.205)	0.408* (0.221)	0.421* (0.226)	0.381* (0.217)

Variables	Domains								
	Agriculture production			Non-farming business activity			Protection from violence		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Household expenditure per capita	0.022 (0.067)	0.003 (0.065)	-0.041 (0.067)	-0.020 (0.083)	-0.056 (0.082)	-0.069 (0.085)	-0.174** (0.075)	-0.173** (0.076)	-0.199*** (0.077)
Barisal	0.530 (0.828)	0.447 (0.774)	0.639 (0.820)	0.441 (0.946)	0.415 (0.868)	0.575 (0.945)	0.636 (0.576)	-0.106 (0.540)	0.619 (0.566)
Chittagong	-1.155*** (0.402)	-1.339*** (0.412)	-1.103*** (0.396)	-1.233*** (0.536)	-1.390*** (0.565)	-1.179** (0.536)	-2.486*** (0.429)	-2.801*** (0.416)	-2.393*** (0.419)
Khulna	1.036*** (0.353)	0.780** (0.340)	1.025*** (0.335)	1.335*** (0.445)	1.078** (0.438)	1.340*** (0.447)	-0.180 (0.432)	-0.745** (0.348)	-0.208 (0.453)
Rajshahi	-0.771 (0.635)	-0.716 (0.566)	-0.805 (0.587)	-1.302* (0.692)	-1.221** (0.622)	-1.271* (0.679)	-1.350* (0.739)	-1.682*** (0.591)	-1.394* (0.713)
Rangpur	-1.291*** (0.362)	-1.196*** (0.357)	-1.301*** (0.356)	-1.966*** (0.437)	-1.754*** (0.421)	-1.940*** (0.437)	-3.338*** (0.340)	-3.042*** (0.392)	-3.367*** (0.346)
Sylhet	-0.924* (0.511)	-0.847* (0.460)	-0.767 (0.494)	-1.470** (0.666)	-1.433** (0.624)	-1.309** (0.665)	0.406 (0.432)	0.076 (0.390)	0.439 (0.440)
Feel can make decisions	0.316** (0.159)	0.132 (0.151)	0.168 (0.155)	0.362* (0.185)	0.153 (0.190)	0.298 (0.185)	0.136 (0.195)	-0.070 (0.202)	0.108 (0.197)
Satisfaction with decisions	-	1.090*** (0.117)	-	-	1.097*** (0.160)	-	-	1.391*** (0.150)	-
Power to make decisions	-	-	0.235*** (0.044)	-	-	0.154*** (0.054)	-	-	0.119** (0.060)
Constant	3.478*** (0.692)	-0.290 (0.835)	2.605*** (0.728)	3.427*** (1.185)	-0.757 (1.445)	2.820** (1.260)	4.866*** (0.756)	-0.488 (1.024)	4.487*** (0.810)

Variables	Domains								
	Agriculture production			Non-farming business activity			Protection from violence		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
F-statistic	6.03***	11.64***	8.42***	9.57***	16.20***	9.52***	14.13***	18.52***	12.33***
R-squared	0.080	0.139	0.102	0.135	0.189	0.144	0.201	0.281	0.208
Number of observations	2 636	2 562	2 636	1 607	1 509	1 607	1 523	1 417	1 523

Note: The table does not include the estimates of explanatory variables that are not significant in any of the regressions presented, namely: occupation of household head, nutrition and drinking water. *** p<0.01, ** p<0.05, * p<0.1.

Tables 6.1 (sample of men) and 6.2 (sample of women) present the estimates of equation (2) for the RAI in the same domains considered above, except “livestock raising”. For each domain-specific RAI we present three sets of results, where we examine sensitivity of adding the following explanatory variables:

- (i) The domain-specific indicator “feel can make decision”;
- (ii) The domain-specific indicators “feel can make decisions” and “satisfaction with decisions made”; and
- (iii) The domain-specific indicator “feel can make decisions” and the general indicator “power to make important decisions”.

The indicator “feel can make a decision” is only significantly associated with the RAI in some domains. So, as suggested by the correlation analysis, this indicator is not a good candidate to proxy autonomy.

On the other hand, the indicators “satisfaction with decisions made” and “power to make important decisions” are significantly associated with higher levels of autonomy of men and women in all domains. Nevertheless, they still do not account for a large portion of the variation, which is indicated by the low magnitude of the R-squared and the fact that in most cases their inclusion as explanatory variables does not affect the significance of the other determinants of autonomy (except for the variable “feel can make the decisions”). Under these circumstances, it remains unclear whether these indicators can be used as proxies for autonomy, or whether they are simply indicators that are also correlated with autonomy.

VI. CONCLUSION

This paper provides a detailed examination of the Relative Autonomy Index (RAI), using data representative of Bangladeshi rural areas. We report mixed, but largely positive, results in terms of the conceptual validity of the RAI. We find evidence of three dimensions in the data, each corresponding to one of the motivation subscales, exactly as predicted by the measurement model. The surprise is that we do not always find an ordered correlation among the three motivation subscales as expected by the self-determination continuum. Instead, we find gender patterns of correlations. In the sample of men, we find that external and introjected motivations are strongly correlated, whereas both are weakly correlated with autonomous motivations, as predicted by the RAI measurement model. In the sample of women, we find that external motivation is positively and strongly correlated with introjected and autonomous motivations, yet the correlations between introjected and autonomous motivations tend to be weak. We speculate that the strong correlation between external and autonomous motivation arises because Bangladeshi women internalize societal norms and “make them their own”; but more qualitative work is needed to study this issue.

Our exploratory analysis of the determinants of men’s and women’s autonomy in Bangladesh shows that neither age, education nor income are suitable proxies for autonomy. We also find no robust evidence that other indicators on decision-making adequately proxy autonomy.

The search for rigorous, transparent and domain-specific measures of empowerment that can be used for gender analysis remains ongoing. Many indicators have failed to fulfil the criteria required for rigorous quantitative analyses of women’s empowerment. This paper demonstrates that the RAI as implemented in Bangladesh is a reliable indicator of autonomy, and adds value and information to variables such as education, expenditure, age, mobility or decision-making. It distinguishes male from female autonomy, and differentiates autonomy levels across different domains. As such, the RAI very much remains a strong candidate for empirical studies of empowerment. To further advance this field, it is necessary to explore qualitatively what appear to be cultural influences on women’s external motivation in Bangladesh, implement the RAI in additional geographic and cultural settings and explore its validity and reliability in those settings.

REFERENCES

- Abell, N., D. W. Springer, and A. Kamata (2009). *Developing and Validating Rapid Assessment Instruments*. New York: Oxford University Press.
- Ahmed, A. (2013). *Bangladesh Integrated Household Survey (BIHS) 2011-2012*. Washington, D.C.: International Food Policy Research Institute (datasets). Available from <http://hdl.handle.net/1902.1/21266>.
- Alkire, S. (2005). Subjective quantitative studies of human agency. *Social Indicators Research*, vol. 74, No. 1, pp. 217-260.
- Alkire, S. (2008). Concepts and measures of agency. Oxford Poverty and Human Development Initiative (OPHI) Working Paper, No. 9. Oxford, United Kingdom: OPHI. Available from <https://ophi.org.uk/working-paper-number-09/>.
- Alkire, S., and others (2013). The women's empowerment in agriculture index. *World Development*, vol. 52, pp. 71-91.
- Allen, E., and C. Seaman (2007). Likert scales and data analyses. *Quality Progress*, vol. 40, No. 7 pp. 64-65.
- Alsop, R., M. F. Bertelsen, and J. Holland (2006). *Empowerment in Practice: From Analysis to Implementation*. Washington, D.C.: World Bank. Available from http://commonweb.unifr.ch/artsdean/pub/gestens/f/as/files/4760/24995_105259.pdf.
- Becker, E. (2012). Themes from feed the future women's empowerment in agriculture index: report from qualitative case studies in Bangladesh, Guatemala and Uganda. Unpublished report submitted to the International Food Policy Research Institute. Washington, D.C.
- Brown, J. (2011). Likert items and scales of measurement? *Shiken: JALT Testing & Evaluation SIG Newsletter*, vol. 15, No. 1, pp. 10-14.
- Carifio, J., and R. Perla (2007). Ten common misunderstandings, misconceptions, persistent myths and urban legends about likert scales and likert response formats and their antidotes. *Journal of Social Sciences*, vol. 3, No. 3, pp. 106-116.
- Chirkov, V. I. (2009). A cross-cultural analysis of autonomy in education: A self-determination theory perspective. *Theory and Research in Education*, vol. 7, No. 2, pp. 253-262.
- Chirkov, V. I., R. M. Ryan, and K. M. Sheldon (2011). *Human Autonomy in Cross-cultural Contexts: Perspectives on the Psychology of Agency, Freedom, and Well-being*. Dordrecht, Netherlands: Springer.
- Chirkov, V. I., and others (2003). Differentiating autonomy from individualism and independence: a self-determination theory perspective on internalization of cultural orientations and well-being. *Journal of Personality and Social Psychology*, vol. 84, No. 1, pp. 97-110.
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, vol. 78, No. 1, pp. 98-104.
- Deci, E. L., and R. M. Ryan (2012). Motivation, personality, and development within embedded social contexts: an overview of self-determination theory. In *Oxford Handbook of Human Motivation*, R. M. Ryan, ed. Oxford, United Kingdom: Oxford University Press.
- Drèze, J., and A. Sen (2013). *An Uncertain Glory: India and its Contradictions*. Princeton: Princeton University Press.
- Guio, A. C., D. Gordon, and E. Marlier (2012). Measuring material deprivation in the EU: indicators for the whole population and child-specific indicators. Eurostat Methodologies and Working

- Paper. Luxembourg: Publications office of the European Union. Available from: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-12-018/EN/KS-RA-12-018-EN.PDF.
- Hemker, B. T., K. Sijtsma, and I. W. Molenaar (1995). Selection of unidimensional scales from a multidimensional item bank in the polytomous Mokken IRT model. *Applied Psychological Measurement*, vol. 19, No. 4, pp. 337-352.
- Ibrahim, S., and S. Alkire (2007). Agency and empowerment: a proposal for internationally comparable indicator. *Oxford Development Studies*, vol. 35, No. 4, pp. 405-430.
- Kishor, S., and L. Subaiya (2008). *Understanding Women's Empowerment: A Comparative Analysis of Demographic and Health Surveys (DHS) Data. DHS Comparative Reports 20*. Calverton, United Kingdom: Macro International.
- Levesque, C. S., and others (2007). Validating the theoretical structure of the treatment self-regulation questionnaire (TSRQ) across three different health behaviours. *Health Education Research*, vol. 22, No. 5, pp. 691-702.
- Malhotra, A., S. Schuler, and C. Boender (2002). Measuring women's empowerment as a variable in international development. Background paper prepared for the World Bank Workshop on Poverty and Gender: New Perspectives. 28 June. World Bank. Available from <http://siteresources.worldbank.org/INTGENDER/Resources/MalhotraSchulerBoender.pdf>.
- Narayan, D. (2005). Conceptual framework and methodological challenges. In *Measuring Empowerment: Cross Disciplinary Perspectives*, D. Narayan, ed. Washington, D.C.: World Bank. Available from <https://openknowledge.worldbank.org/handle/10986/7441>.
- Panda, P., and B. Agarwal (2005). Marital violence, human development and women's property status in India. *World Development*, vol. 33, No. 5, pp. 823-850.
- Ryan, R. M., and J. P. Connell (1989). Perceived locus of causality and internalization: examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, vol. 57, No. 5, pp. 749-761.
- Ryan, R. M., and E. L. Deci (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, vol. 55, No. 1, pp. 68-78.
- Samman, E., and M. E. Santos (2009). Agency and empowerment: a review of concepts, indicators and empirical evidence. Oxford Poverty and Human Development Initiative (OPHI) Working Paper, No. 10a. Oxford, United Kingdom: OPHI. Available from <https://ophi.org.uk/ophi-research-paper-10a/>.
- Sraboni, E., A. R. Quisumbing, and A. U. Ahmed (2013). *The Women's Empowerment in Agriculture Index: Results from the 2011-2012 Bangladesh Integrated Household Survey*. Project report submitted to the United States Agency for International Development. Dhaka: International Food Policy Research Institute. Available from <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/127504>.
- Sraboni, E., and others (2013). Women's empowerment in agriculture: What role for food security in Bangladesh? *World Development*, vol. 61, pp. 11-52.
- StataCorp (2013). Stata Statistical Software: Release 13. College Station, Texas: StataCorp LP.
- Vaz, A., P. Pratley, and S. Alkire (2016). Measuring women's autonomy in Chad using the Relative Autonomy Index. *Feminist Economics*, vol. 22, No. 1, pp. 264-294.