Community Level Change: The Development of a Measure

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Between 1948 and 2012, less than 50% of the voting-age population turned out for midterm elections, which generally impact state and local governments (Desilver, 2014). Additionally, in 2015, less than 25% of the population participated in volunteer activities (U.S. Department of Labor, 2016). This lack of engagement may be due to individuals believing that nothing they do will change their community.

Previous research has indicated that it is possible to increase volunteerism by strengthening the community's perception that it can positively impacting a specific area of concern (Omoto & Snyder, 2002). Furthermore, climate research studies show that an effective method to improve climate conscious behavior (e.g., recycling and reducing electricity use) on a community level is emphasizing the true impact that these habit changes can have on the world (Roser-Renouf et al., 2014). Promoting the belief that change is possible on a community level has the ability to create positive large-scale effects. Maton (2008) also claims that people need to believe in and be passionate about change in order to empower a community.

Therefore, a scale that measures an individual's belief in community change would have tremendous benefits to a community by allowing researchers and organizations to further understand and help specific communities. A scale measuring an individual's belief in community change would make it possible to identify a potential cause of inaction and inform interventions to enhance community members' beliefs about the impact of their actions. Additionally, identifying individuals who strongly believe in change may predict who will and will not participate in the community and work toward change.

Based on this understanding, the purpose of this study is to develop a belief in change scale. Belief in change was defined as the extent to which individuals feel that it is possible to influence change in their community through various behaviors. The definition of community for the purposes of this study is a group of people with diverse characteristics who engage in joint action within a confined geographical location and are linked by social ties or shared common perspectives (Macqueen et al., 2001). Additionally, it should be emphasized that this study was focused on social change – meaning it incorporate avenues of change beyond just the political system. Social change can be defined as any small- or large-scale alteration to social, economic, political, or environmental practices and/or structures.

A 19-item measure was developed by the researchers of the study and is shown in Appendix A. This measure was defined as the *Belief in Change Scale* and is composed of two dimensions. These two dimensions are: (1) Belief that social change is possible and (2) Belief in agency to influence social change. Dimension one refers to the extent to which individuals believe that their community is able to change. Dimension two refers to the extent to which individuals believe that they personally have the ability to influence change in their community.

This 19-item measure and its corresponding dimensions was originally developed with a total of 29 items. However, the items were given to identified subject matter experts (SMEs) in community level change. SMEs looked through the items and gave their thoughts about how they were associated with the construct of community-level change. The advice and opinions of the SMEs were take seriously and discussed among the researchers. After much collaboration and discussion, the final 19-item measure shown in Appendix A was used to understand the construct of belief in community level change and its corresponding dimensions. The original 29-item measure is available upon request.

Hypotheses

This research study was interested in understanding how this newly proposed 19-item measure applied to an adult population. Therefore, the following hypotheses are proposed:

1. The proposed belief in change scale will appropriately map on to its two proposed dimensions - (1) Belief that social change is possible and (2) Belief in agency to influence social change – appropriately using confirmatory factor analyses (CFA) and Exploratory Factor Analyses (EFA) methods.
2. The belief in change scale will establish convergent validity by having a medium to high correlation with scales established in measuring perceived control at the community level.
3. This scale will establish discriminant validity by having a weak correlation with an established locus of control scale.

Methods

Procedures

A convenience sample collected through an online survey consisting of several informational measures and demographic information via Qualtrics online survey platform (Qualtrics, Provo, UT). Surveys took approximately 20-25 minutes to complete and were administered through social media websites, such as Facebook, and email. Within the survey, many measures were collected, including: The Big 5 personality scale, measures on purpose in life, competitiveness, belief in community change and many other measures. All survey collection methodology was approved by Colorado State University Institutional Review Board.

Participants

Participants in this study consisted of 173 adults aged 19 to 84 (M = 39.6, SD = 17.5). Only participants that completed the 19-item change scale were included in the analysis of the study (*n* = 121). Demographic information for the study participants are displayed in T*able 1*. The sample for this study consisted mostly of females (74.8%) and individuals identifying as white (84.0%).

Convergent & Discriminant Measures

Hypotheses two and three focused on establishing convergent and discriminant validity based on assessing the correlations between established scales of perceived community control and perceived locus of control.

Perceived community control was measured using Israel, Checkoway, Schulz, & Zimmerman's (1994) perceived control at the community level scale. This 5-item measure takes into account how much power one has within their community. However, unlike the belief in change scale at hand, it does not measure an individual's *belief* in change. Therefore, this serves as a convergent measure and expected to have a medium to strong correlation with the belief in change scale. Next, the Lumpkin's (1985) locus of control measure was used as a discriminant measure. This measure has a focus on how much one believes they have control over their life, and therefore is different than their belief in social change. It was perceived that this would correlate weakly. It was expected to have the weakest correlation with the general belief in social change dimension over the personal agency of change because the first dimension does not require the actual belief that the individual needs to contribute to this change. Each of these scales were manipulated and measured on the same likert-type rating as the belief in change scale in order to allow for a more accurate representation of the correlation between measures.

Statistical Methodology and Procedures

All statistical analyses and computations were performed using R 3.4.4 (R Core Team, 2018). For all confirmatory and exploratory factor analyses, both Chronbach's Alpha (α) and Omega Coefficients (Ω) will be reported (Cronbach, 1951; Dunn, Baguley & Brunsden, 2014). Differences in these coefficients are a sign of uncertainty in the true scale reliability; however, they are often the similar. For the purpose of this study, reliability coefficients that are higher than 0.80 were considered sufficient.

Additionally, model fit indices were calculated for all confirmatory and exploratory factor analyses. These indices include: The Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA). An a-priori standard of greater than 0.90 for the CFI & TLI were set as indication of sufficient model fit. For the RMSEA, a value lower than 0.10 was indication of a sufficient model fit. These a-priori criteria were used to guide the researchers to find the ideal factor model and best set of items to measure the overall construct of belief in community change. In the event that any of these a-priori criteria were not met for the CFA analyses, the item residual correlations were assessed after extracting the standardized factor loadings from the CFA. These residual item correlations are meant to have low correlations with one another. Therefore, any residualized factor loading that correlated with other items in the scale by an absolute value of 0.1 were considered non-sufficient items and were removed until all a-priori criteria were met. Due to journal word limit restrictions, the residualized correlation item elimination process cannot be explained in great detail. However, the authors will provide all procedures, steps, and analyses if requested.

Results

Item and Scale Descriptive Statistics

Item difficulty was assessed by obtaining the mean scores of each item. A higher score indicates that the response option was more likely to be chosen. In the context of this scale, scores closer to five are indicated as "easier" items because individuals that obtain higher scores on these items are likely to have higher scores of the proposed belief in change construct. The overall mean for the general belief in social change scale was 4.15 (SD = 0.51), indicating that this sample has a high general belief in social change. For the next dimension, belief in agency to provoke social change, the mean score was 3.89 (SD = 0.57). Results for the next dimension indicate an overall high belief in the individual agency, but this mean score was not as high as the general belief in change. *Table 2* shows the mean scores for all items, separated by dimension. In general, this sample tended to score highly (a mean score above 3) on each item among both dimensions of the belief in change scale.

Item correlations were used to assess item discrimination and are shown in *Table 3*.

General Belief in Change Correlations

As can be seen from *Table 3*, the general belief in social change scale correlated quite well with each other. With the exceptions of items 2 & 3 from the general belief dimension, all item correlations were significant with each other. Furthermore, with some exceptions, these items, although somewhat correlated, did not as correlate as well with the general belief in social change dimension. Additionally, all general belief in social change items correlated highly within the overall general belief in social change dimension score and they did not correlate as highly with individual agency to contribute towards social change score.

Individual Agency in Change Correlations

The individual agency individual items did not correlate as highly as expected. However, these items did correlate very well with the overall individual agency dimension score. These results indicate that although the items are not correlating with each other, they are all very correlated with the latent variable being assessed. Further information regarding the individual items and their relationship with each other and the overall dimension will be assessed with a CFA and EFA. Lastly, none of these items correlated too highly with the overall scores from the general belief in change dimension – thus providing evidence that the dimensions are distinct.

Confirmatory Factor Analyses

The items were assigned a-priori to separate dimensions – therefore, a CFA was used to assess how well the items appropriately mapped onto the two dimensions. Results from the CFA are displayed in *Table 4*. The reliability of the general belief in social change dimension was good overall ($\alpha = 0.92$; $\Omega = 0.92$). The reliability for the individual agency to create social change in a community was also good ($\alpha = 0.91$; $\Omega = 0.91$). The overall measure (both dimensions compounded) also indicated a good reliability ($\alpha = 0.94$; $\Omega = 0.95$). However, all three fit indices did not meet the criteria for sufficient model fit (Shown in *Table 4*).

Based on the model fit indices, the next step was to assess items and create a more parsimonious model that measured each dimension of the construct. Item and scale reduction was processed by looking at residual correlations. Based on the a-priori criteria of residualized correlations, the researchers decided to remove items 2, 3, and 7 from the general belief in community change scale and items 3, 4, 6, 8, and 9 from the individual agency to enact social change dimension.

The results from the more parsimonious, reduced model, are shown in *Table 5*. The corresponding reliability coefficients for the general belief in change dimension (α = 0.91; Ω = 0.92), individual agency for social change dimension (α = 0.82; Ω = 0.82) and overall scale (α = 0.90; Ω = 0.92) all remained in the realm of sufficient for the purpose of this study. Additionally, as can be seen in *Table 5* the model fit indices all passed the a-priori criteria of good fit. The reduced version of the measure is provided in Appendix B for convenience.

Exploratory Factor Analyses

The next step in this research study was to perform an EFA to further understand the mapping of each item to its corresponding dimension and its fit in the overall belief in change scale. The EFA is used in this study to understand if the items load as predicted by the CFA, even when no theoretical approach is taken. Parallel analysis was used to give a suggested number of recommended factors. Using the Psych package in R's Comprehensive R Archive Network (CRAN) repository (Revelle, 2018) a number of factors was recommended. This package uses a simulated analysis to recommend factor solutions based on simulated eigen values as compared to the actual eigen values as provided by the sample data. The researchers also assessed the scree plot themselves to look for "bends" in the scree plot. "Bends" in the scree plot indicate that the factor at which there is a steep decrease in the slope of explained variance, as defined by the eigenvalue, and a significant value is not being explained by the factor.

Based on the assumption that the items correlated with each other, an oblique rotation used for all 2+ factor solutions to the model. Additionally, EFA comparisons and were compared using chi square difference significance testing. The researchers first performed an EFA and

looked for the recommended solution using all of the items and then proceeded to perform the same methodology, but on the reduced items shown in Appendix B.

All Item EFA

Running a parallel analysis, the recommended factor solution was 6 factors based on simulated analyses. A scree plot identifying the eigenvalues for each factor solution and the simulated eigen values is shown in *Figure 1*. The eigen values are the amount of variance explained when adding in additional factors. When the researchers assessed the scree plot themselves, they determined that the "bend" of the scree plot was identified at 2-factors. Therefore, a chi-square difference test looking at a 1-factor, 2-factor, and 3-factor solution was assessed. Results from this analysis can be seen in *Table 6*. As can be seen in *Table 6*, all three of the assessed solutions yielded significant chi-square difference tests. The results indicate that, with all of the original items included, the minimum recommended factors in this scale is *at least* three.

Reduced Model EFA

Next, using the same methods, this study utilized the EFA framework to assess the suggested number of factors from the reduced scale (as shown in Appendix B). Using parallel analyses, the recommended solution from the psych package was three factors. The researcher "bend" approach assessed a 2-factor solution was best as seen in the scree plot shown in *Figure 2*. Therefore, an additional series of chi-square difference tests comparing a 1-factor, 2-factor, and 3-factor solution on the reduced set of items was assessed. Results and necessary fit statistics are shown in *Table 7*. Results from *Table 7* indicate that both the 2-factor and 3-factor models have sufficient model fit given this study's fit criteria. However, in the interest in parsimony, the

less complicated model is preferred if possible. The Chi-square difference test comparing the 2-factor and 3-factor solution proposed by the EFA indicates that the 3-factor model is not any better fit than the 2-factor model. Therefore, the most satisfactory model in this reduced set of items is the 2-factor solution.

Discriminant and Convergent Validity

This research study also sought to determine convergent and discriminant validity of the belief in change scale based on hypothesis 2 & 3. To properly provide evidence for convergent and discriminant validity, a correlation between the belief in change measure dimensions was correlated with already established measures of perceived community control and locus of control. A correlation matrix showing the scale total correlations with the other measures is provided in *Table 8*. Results from *Table 8* show that all scales correlate strong with one another. This provides much more evidence of convergent validity than discriminant validity among our measures. It should be noted that reliability coefficients for both the perceived community control ($\alpha = 0.50$; $\Omega = 0.58$) and the locus of control measures ($\alpha = 0.66$; $\Omega = 0.67$) were both very low. Therefore, the correlation result from this analysis should be interpreted with caution.

Discussion

This study sought to measure the construct of belief in change using various methods. The initial construction of the belief in change scale was guided by background research and advice from identified SMEs. However, the course of analyses provided a reduced set of items for measuring the belief in change construct. The combination of CFA, EFA, and convergent/discriminant validity evidence helps provide stronger reasoning that the latent

variable is being measured appropriately. By providing two dimensions to this construct, the measure helps to give a broader grasp to the nomological net that is proposed by the researchers.

Limitations & Future Research

The convergent and discriminant measures used to answer hypotheses 2 and 3 unfortunately did not provide as desirable results and reliability coefficients as they have in past studies (Israel, Checkoway, Schulz, & Zimmerman, 1994; Lumpkin, 1985). Therefore, although Hypothesis 3 was not supported through the discriminant validity measures, it is likely that the results of the correlation are not true parameter estimates due to the low reliability of those measures.

This measure is the first of its kind in understanding the belief in change construct which, of course, leaves it open to limitations. This is the first study to incorporate this measure into an adult population. Therefore, the true nature of the analyses is left to wider interpretations. More studies should incorporate this measure into their research. The use of the shortened measure (Appendix B) can be tested against similar populations to see if the reliability and factor analyses results are consistent over time.

Conclusion

The reduced version of this measure shows promising results and may have the ability to help serve communities in the future. This study has the advantage of using multiple methodologies to provide the most beneficial and reliable understanding of a newly developed scale. Therefore, with increased collaboration and understanding of the construct of change it can be easily utilized in community needs assessments to understand where a community in its yearn for change.

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Table 1

Demographics of participants

Demographic	Frequency	Percent (Missing excluded)
Gender		
Male	25	23.4
Female	80	74.8
Other	2	1.8
Missing	66	
Race		
Black	1	< 1.0
White	89	84.0
Asian	8	7.5
Native American	0	0
Pacific Islander	0	0
Other	8	7.5
Missing	67	

Table 2

Dimension item level descriptive statistics

Item	*M*	*SD*	*SE*
Dimension 1: Belief that social change is possible			
1	4.16	0.56	0.05
2	4.25	0.77	0.07
3	4.18	0.62	0.06
4	3.93	0.74	0.07
5	4.27	0.58	0.05
6	4.16	0.68	0.06
7	4.22	0.49	0.04
8	4.15	0.72	0.07
9	4.14	0.69	0.06
Dimension 2: Belief in agency to influence social change			
1	4.14	0.75	0.07
2	3.59	0.95	0.09
3	4.19	0.58	0.05
4	4.12	0.67	0.06
5	3.89	0.72	0.07
6	4.12	0.64	0.06
7	4.07	0.65	0.06
8	3.72	0.80	0.07
9	3.54	1.02	0.09
10	3.50	0.92	0.08

Table 3

Item Correlations and corresponding dimension correlations

Item	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	*Dimension 1*
Dimension 1: Belief that social change is possible																				
1.2	.44*																			
1.2	.74**	.23																		
1.4	.60**	.40	.39																	
1.5	.55**	.35	.41	.66**																
1.6	.78**	.46*	.62**	.84**	.60**															
1.7	.83**	.33	.78**	.45*	.61**	.65**														
1.8	.62**	.12	.29	.67**	.63**	.67**	.57**													
1.9	.63**	.59**	.36	.89**	.67**	.88**	.48*	.68**												
Dimension 2: Belief in agency to influence social change																				
2.1	-.22	-.43*	-.06	-.34	-.19	-.36	-.15	-.24	-.46*											
2.2	-.48*	-.09	-.43*	-.15	-.37	-.33	-.57**	-.33	-.13	.24										
2.3	-.04	-.22	.17	-.20	-.02	-.12	.11	-.22	-.26	.80**	.12									
2.4	-.28	-.44*	-.09	-.39	-.21	-.38	-.08	-.25	-.51*	.83**	.14	.84**								
2.5	-.27	.06	-.17	-.00	-.11	-.11	-.23	-.26	.03	.44*	.68**	.50*	.47*							
2.6	-.09	-.15	-.05	-.10	.05	-.01	.06	-.09	-.13	.44*	.05	.50*	.58**	.32						
2.7	-.17	.16	-.10	.10	.03	-.05	-.19	-.19	.15	.27	.45*	.42	.28	.71**	.09					
2.8	-.01	-.19	-.18	.07	.04	-.14	-.02	.26	-.10	.35	.18	.30	.53*	.32	.24	.34				
2.9	-.03	-.16	-.03	.05	-.19	-.15	-.06	.10	-.09	.44*	.33	.31	.31	.37	-.02	.48*	.57**			
2.10	-.41	-.11	-.27	-.18	-.23	-.44*	-.30	-.29	-.35	.27	.30	.12	.40	.34	.30	.34	.48*	.38		
Overall Dimensions																				
Dimension 1	.86**	.57**	.65**	.86**	.77**	.93**	.77**	.75**	.90**	-.37	-.38	-.14	-.39	-.14	-.08	-.02	-.04	-.07	-.36	
Dimension 2	-.34	-.26	-.22	-.19	-.23	-.36	-.27	-.24	-.31	.76**	.57**	.69**	.78**	.76**	.49*	.64**	.65**	.66**	.62**	-.34

Note. * indicates $p < .05$. ** indicates $p < .01$.

Table 4

Confirmatory Factor Analysis standardized factor loadings: All items included

Item number	Standardized factor loading (SE)
Dimension 1: Belief that social change is possible	
1	0.442 (0.04)
2	0.470 (0.07)
3	0.422 (0.05)
4	0.614 (0.06)
5	0.419 (0.05)
6	0.597 (0.05)
7	0.368 (0.04)
8	0.526 (0.06)
9	0.603 (0.05)
Dimension 2: Belief in agency to influence social change	
1	0.566 (0.06)
2	0.543 (0.08)
3	0.479 (0.04)
4	0.537 (0.05)
5	0.563 (0.06)
6	0.418 (0.05)
7	0.474 (0.05)
8	0.574 (0.06)
9	0.700 (0.08)
10	0.559 (0.08)

Model fit indices:

Comparative Fit Index (CFI) = 0.818

Tucker-Lewis Index (TLI) = 0.794

Root Mean Square Error of Approximation RMEA = 0.128, 90% CI [0.114, 0.142]

Table 5

Confirmatory Factor Analysis standardized factor loadings: Reduced measure

Item number	Standardized factor loading (SE)
Dimension 1: Belief that social change is possible	
1	0.406 (0.05)
4	0.637 (0.06)
5	0.409 (0.05)
6	0.598 (0.05)
8	0.527 (0.60)
9	0.634 (0.05)
Dimension 2: Belief in agency to influence social change	
1	0.460 (0.06)
2	0.638 (0.08)
5	0.630 (0.06)
7	0.505 (0.05)
10	0.535 (0.08)

Model fit indices:

Comparative Fit Index (CFI) = 0.956

Tucker-Lewis Index (TLI) = 0.944

Root Mean Square Error of Approximation RMEA = 0.082, 90% CI [0.051, 0.110]

Table 6

EFA Model fit statistics & Chi-square difference tests: All items

	Chi-Square	*df*	*p*	*RMSEA*	*TLI*
Model 1 (1 factor)	415.75	152	<.001	0.172	0.639
Model 2 (2 factor)	170.51	134	0.02	0.136	0.774
Model 3 (3 factor)	87.74	117	0.98	0.119	0.828
Chi-square difference tests					
Model 1 vs Model 2	245.24	18	<.001		
Model 2 vs Model 3	82.78	17	<.001		

Table 7

EFA Model fit statistics & Chi-square difference tests: Reduced set of items

	Chi-Square	*df*	*p*	*RMSEA*	*TLI*
Model 1 (1 factor)	147.36	44	<.001	0.166	0.772
Model 2 (2 factor)	23.29	34	0.92	0.102	0.915
Model 3 (3 factor)	10.80	25	0.99	0.081	0.948
Chi-square difference tests					
Model 1 vs Model 2	124.07	10	<.001		
Model 2 vs Model 3	12.49	9	0.19		

Table 8

Measure and dimension correlations

Measure/Dimension	1	2	3	4
1. Belief in change (full measure)				
2. Belief that social change is possible dimension	.92*			
3. Belief in agency to influence social change dimension	.91*	.67		
4. Perceived community control scale	.61	.59	.52	
5. Perceived locus of control scale	-.81	-.88	-.59	-.89*

Note. * indicates $p < .05$.

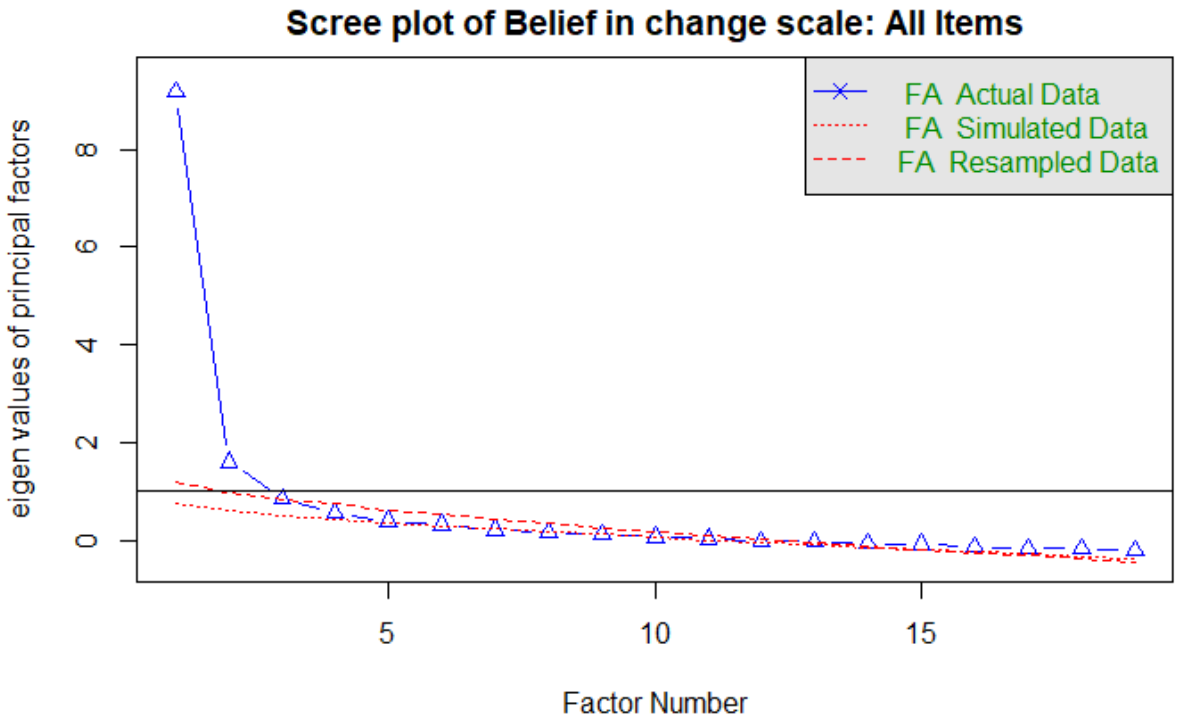

Figure 1. Scree plot of scale with all items included (Item descriptions available in Appendix A). *Note*. FA = Factor Analysis. Simulated and Resampled data are the comparison values for suggested number of factors.

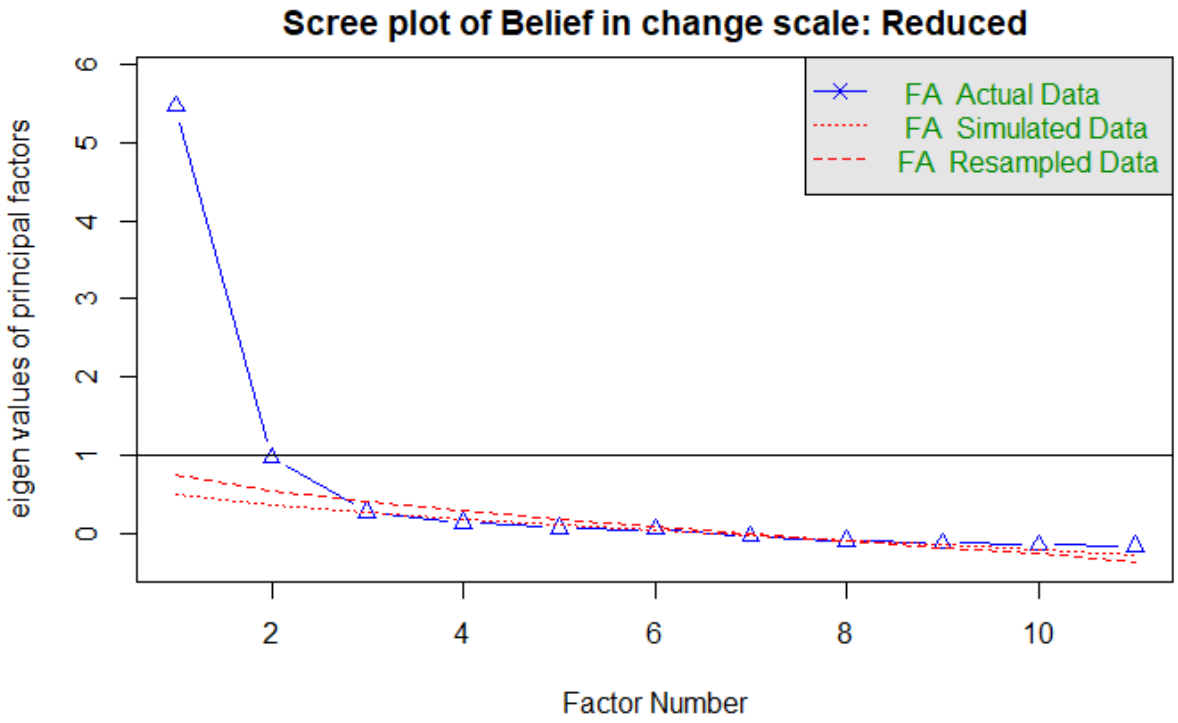

Figure 2. Scree plot of scale with reduced set of items (Item descriptions available in Appendix B).
Note. FA = Factor Analysis. Simulated and Resampled data are the comparison values for suggested number of factors.

Appendix A

The Belief in Change Scale

When we refer to "community," we mean the social/political/physical environment created by a group of people who are located close to each other. This could refer to your neighborhood, town, city, etc.

Please indicate the extent to which you agree or disagree with the following statements.

Dimension 1: Belief that social change is possible

1. I believe positive change is possible in my community.
2. Positive community change is impossible. (reverse coded)
3. It is possible for my community to improve.
4. My community is unlikely to change for the better. (reverse coded)
5. My community can progress over time.
6. I think positive change in my community is unrealistic. (reverse coded)
7. My community has the potential to change for the better.
8. I am optimistic that my community can make progress.
9. I doubt that positive change can happen in my community. (reverse coded)

Dimension 2: Belief in agency to influence social change

1. I have the power to contribute to positive change in my community.
2. What happens in my community is out of my control. (reverse coded)
3. My actions can positively impact my community.
4. There are ways that I can change my community for the better.
5. No matter what I do, my community will remain the same. (reverse coded)
6. Advocating for change can help influence my community.
7. I am powerless to improve my community. (reverse coded)
8. I am confident that I can change my community for the better.
9. I doubt my ability to improve my community. (reverse coded)
10. I believe that I have influence over the conditions in my community.

Note: All items were scored using a 5-point Likert scale (1=strongly agree, 2=somewhat agree, 3=neither agree nor disagree, 4=somewhat disagree, 5=strongly disagree)

Appendix B

The Belief in Change Scale (Reduced)

When we refer to "community," we mean the social/political/physical environment created by a group of people who are located close to each other. This could refer to your neighborhood, town, city, etc.

Please indicate the extent to which you agree or disagree with the following statements.

Dimension 1: Belief that social change is possible

1. I believe positive change is possible in my community.
2. My community is unlikely to change for the better. (reverse coded)
3. My community can progress over time.
4. I think positive change in my community is unrealistic. (reverse coded)
5. I am optimistic that my community can make progress.
6. I doubt that positive change can happen in my community. (reverse coded)

Dimension 2: Belief in agency to influence social change

1. I have the power to contribute to positive change in my community.
2. What happens in my community is out of my control. (reverse coded)
3. Advocating for change can help influence my community.
4. I am powerless to improve my community. (reverse coded)
5. I believe that I have influence over the conditions in my community.

Note: All items were scored using a 5-point Likert scale (1=strongly agree, 2=somewhat agree, 3=neither agree nor disagree, 4=somewhat disagree, 5=strongly disagree)