Self-Esteem of Potential Future Leaders in North Korea: Self-Liking vs. Self-Competence via Linked Data[1]

Asaph Young Chun, Yun Seo Bae, Jason Kyungjin Park, Yoonha Chun
The ISR Foundation Center for Science Diplomacy
PSI Institute for Data Science, Survey Methodology, and Interdisciplinary Research

Abstract[2]: The linked survey findings in this paper provide a glimpse of how potential future leaders in the Democratic People's Republic of Korea (DPRK, also known as North Korea) that many consider "a hermit kingdom" perceive their own self-esteem and how that compares with the self-esteem of peers in collectivist and individualistic countries. The PSI Institute for Data Science, Survey Methodology and Interdisciplinary Research (PSI) conducted a self-administered survey in DPRK. Launched in 2012 in DPRK, the PSI offers an interdisciplinary, intensive teaching program of survey methodology and survey statistics for university students and professionals in developing countries. Arriving from Switzerland, Germany, Australia, Qatar, Britain, and the United States, the PSI faculty planted the seeds of science diplomacy for potential future leaders of survey science in East Asia. The PSI faculty conducted a self-administered survey of students at a leading university in DPRK, assessing their self-esteem based on the Rosenberg Self-Esteem Scale (RSES), the most widely used self-esteem measure in social science research. The DPRK survey findings are linked to a comparative data of self-esteem from 53 countries. We apply extensive data visualizations to the linked data in order to inform self-liking and self-competence of potential future leaders of DPRK in comparison to their peers in a number of other countries.

Key Words: linked data, self-administered survey, cross-cultural survey methodology, North Korea, self-esteem.

[1] The views expressed are those of the authors and not necessarily those of the affiliated institutions.

[2] All authors are affiliated with the ISR Foundation Center for Science Diplomacy as well as the PSI Institute for Data Science, Survey Methodology and Interdisciplinary Research. The PSI is part of the International Strategy and Reconciliation Foundation, a 501(c)(3) non-profit organization based in the Washington metropolitan area.

1. Introduction

Evidence-Based Policymaking (EBP), a term coined from the idea of "evidence-based medicine" and spread to all spheres of public policy, involves the use of evidence collected by scientifically rigorous methods, such as randomized controlled trials. The EBP has garnered support over years from academia and governmental sectors across the Atlantic. For instance, Adrian Smith (1996) introduced the term in his presidential address to the Royal Statistical Society, questioning the current process of ideology-based policymaking and urging for an "evidence-based approach" in public policy. On the other side of the Atlantic, Davies (2004) echoed the EBP as the integration of experience, judgement and expertise with "the best available external evidence from systematic research." Learning from the steps taken by the UK government, the Obama administration kicked off the Evidence-Based Policy Commission in 2016 and took steps of planning accordingly. The Trump administration has continued to institutionalize evidence-based policy development and implementation across all federal agencies.

Survey research-based data and survey data linked to other sources, such as administrative records, are at the heart of evidence-based policy making. We demonstrate in this paper how evidence building is feasible in developing countries where reliable data tend to be rare. Launched in 2012, the PSI Institute for Data Science, Survey Methodology and Interdisciplinary Research (PSI) has developed a program of survey statistics and research methodology classes to instruct undergraduate and graduate students in the Democratic People's Republic of Korea (DPRK, also known as North Korea). The PSI conducted a survey using the Rosenberg Self-Esteem Scale (RSES) with 252 students in the DPRK. The survey was the first ever in social science history to measure self-esteem in the DPRK, a country known as the "hermit kingdom." This study assesses the feasibility of the use of the RSES to measure self-esteem of North Koreans and, where possible, links the DPRK self-esteem data to data pertaining to peers from countries of diverse characteristics. The focus of this paper is on self-liking and self-competence particularly among potential future leaders in the DPRK.

2. Key Concepts[3]

What is the Rosenberg Self-Esteem Scale (RSES)? The RSES is the most widely used measure of self-esteem in social science research (Heatherton & Wyland, 2003). It was developed by sociologist Morris Rosenberg (1965) who defined self-esteem as "the overall positive or negative evaluation of one's worth." Self-esteem is one of the components that form self-concept, which Rosenberg defined as the "totality of the individual's thoughts and feelings with reference to himself as an object" (Rosenberg, 1979).

As Chun et al. (2015) reviewed, self-esteem is closely tied to four principles of self-concept formation: reflected appraisals, social comparisons, self-attributions, and psychological centrality (Rosenberg & Pearlin, 1978). People constantly gauge others' perceptions of them during social interactions, and the reflected appraisals formed from this process influence their own sense of self (Jaret, Reitzes & Shapkina, 2005). The social comparisons component suggests that relative social status compared to others has a significant role in the formation of self-concept. Self-attribution is the process of

[3] We present key concepts as Chun et al. (2015) reviewed.

observing and evaluating one's own actions and behavior and tends to have a self-serving bias. Psychological centrality involves the relative importance of different traits or skills in forming global self-esteem, which is the attitude of an individual toward the self as a totality. Performance in skills that one values highly is more likely to affect self-esteem than performance in areas that one does not care as much about.

What determines self-esteem? Rosenberg observed that self-esteem is subject to external influences and that it affects one's evaluation of one's worth, thus leading to a positive or negative orientation towards oneself. His findings with the RSES suggest that social structural factors, such as families, communities, race, and ethnicity, relate to self-esteem (Rosenberg, 1989). Rosenberg's studies of self-esteem in youth from different economic classes, religions, and ethnicities showed that the subculture of broad social groups is a more likely factor in self-esteem than the prestige rank of those groups. Students who have been raised in a dissonant social environment, where their social group is a minority, are more likely to have low self-esteem compared to those who have been raised in an environment where their social group was the majority or a mixed environment due to experiences of prejudice and cultural dissimilarity. The neighborhood has a larger influence on a child's self-esteem than broader society does (Rosenberg, 1989).

The impact of any given component on global self-esteem will depend on its importance to the individual, according to the concept of psychological centrality. For example, Rosenberg and Pearlin (1978) showed that the more importance an individual places on money, the stronger the relationship between the individual's income and self-esteem. The same principle applies to socioeconomic status, academic performance, and other possible factors of self-esteem. Self-esteem partly derives from the ability to adhere to sociocultural norms. In the case of gender, assuming that gender is a social construction, the basis of self-esteem differs for men and women just as different racial groups base their self-esteem in different criteria (Josephs, Markus & Tafarodi, 1999). Men have a more autonomous, independent, or individualistic sense of self, whereas women have a more collectivist, ensemble, or connected self. Women with high self-esteem feel more interdependent and connected with others, and men with high self-esteem feel more independent and separate from others. The definition of self-esteem differs for men and women because they adhere to different cultural norms.

What are correlates of self-esteem? Effects of high self-esteem include enhanced initiative and happiness, whereas low self-esteem has been found to be related to depression (Baumeister, Campbell, Krueger & Vohs, 2003). Though studies have found a correlation between adolescent self-esteem and delinquency, school performance, and depression, it is unclear whether they are causes or effects. The negative effect of depression on self-esteem is greater than the effect of self-esteem on depression (Rosenberg, Schooler & Schoenbach, 1989). People with low self-esteem are more likely to suffer anxiety. Four factors associated with self-esteem—instability of the self-image, presenting self, vulnerability, and feelings of isolation—contribute to the relationship between self-esteem and anxiety (Rosenberg, 1965). In Sinclair's study of self-esteem across demographic groups within the US, RSES was negatively correlated with neuroticism but positively correlated with extraversion, openness, and conscientiousness (Sinclair et al., 2010).

Self-esteem affects social position. People with low self-esteem are less likely to be active participants or leaders in formal and informal groups because they are less likely to

gain respect from others and are relatively unassertive. People with low self-esteem are also relatively uninterested in public affairs, but even those who are interested are less likely to discuss their views because of their interpersonal attitudes. Those with low self-esteem tend to turn their interests inward, leading to apathy about public affairs. This characteristic could have implications for the operation of a democratic society (Rosenberg, 1965).

Can you apply the RSES across cultures? Previous studies have demonstrated the validity of the RSES across languages and cultures. Schmitt and Allik (2005) administered the RSES to college students in 53 countries. In all 53 nations, global self-esteem was positively correlated with extraversion and negatively correlated with neuroticism. There were a few insignificant correlations, but these occurred in countries with low internal reliability of the RSES. Additionally, 51 countries showed positive correlations between self-esteem and a positive "model of self," which is formed based on childhood experiences of caregiving and affects relationships throughout adult life. The consistency of these external equivalence findings supports the view that self-esteem functions similarly in all cultures. All 53 nations scored above the theoretical midpoint of the RSES, suggesting that generally positive self-evaluations are universal. However, several countries in Asia and Europe scored close to the midpoint (Schmitt & Allik, 2005). It was also observed that more individualistic countries, mostly European, tend to have larger variation in individual self-esteem than collectivist, mostly Asian, countries. This may be explained by the fact that more collectivist cultures tend to avoid the extremes or the endpoints of a scale.

Farruggia's study (2004) of self-esteem in the US, Czech, China, and South Korea also confirmed the cross-cultural relevance of the RSES. With Item 8 ("I wish I could have more respect for myself") of the RSES deleted due to cultural misinterpretation, which was also the case in Schmitt's study, the two-factor model of the RSES showed equivalence across the four countries. Item 8 singularly showed almost no correlation with self-esteem in China or Korea. This could be attributed to a cultural difference in the interpretation of "wishing" as aspiring to an ideal condition instead of desiring more of something that one lacks. US and Czech adolescents had higher averages of positive and negative self-esteem than Chinese and Korean adolescents. Korean adolescents had the lowest self-esteem scores, and there was a strong correlation between self-esteem and parental education. However, contrary to hypotheses about the effects of a collectivist or individualist culture on self-esteem, neither the individualistic nor the collectivist societies shared similar results. Farruggia inferred that there must be cultural differences other than collectivism or individualism that contribute to the difference in self-esteem between China and Korea, similar collectivist societies, and between Czech and the US, which are similar individualist societies.

There has been much research done to compare self-esteem between collectivist and individualist cultures. Tafarodi and Walters (1999) hypothesized that there was a trade-off between self-liking and self-competence, which are two distinct dimensions of global self-esteem, and that collectivist cultures cultivate higher self-liking and lower self-competence and vice versa for the individualist cultures. Self-competence refers to the "generalized sense of one's efficacy or power," and self-liking is the "generalized sense of one's worth as a social object." Whereas self-competence tends to rely on more personal goals and criteria, self-liking is defined by socially transmitted values (Tafarodi & Walters, 1999, p. 798). Their study of British and Spanish college students confirmed

their hypothesis. Schmitt and Allik's study added evidence to support this trade-off hypothesis. After controlling for covariance, comparison of the data from the most individualistic countries (Australia, Belgium, Brazil, France, Italy, Netherlands, New Zealand, Switzerland, UK, US) and the most collectivistic countries (Bangladesh, Botswana, Chile, Democratic Republic of the Congo, Hong Kong, Indonesia, Malaysia, Peru, Serbia, South Korea) supported the "trade-off" hypothesis. Sinclair's study (2010) also confirmed Tafarodi's hypothesis; self-competence was higher and self-liking lower in demographic groups with individualist cultures in the US, and the reverse pattern emerged mostly in collectivist cultures.

The RSES, a Likert-type scale with 10-items as shown in Figure 1, was originally developed with a sample of 5,024 high school juniors and seniors from 10 high schools in New York State. The main goal of the study was to specify the effect of social factors on self-esteem and the influence of self-esteem on behavior (Rosenberg, 1965).

	1 = Strongly Agree	**2 = Agree**	**3 = Disagree**	**4 = Strongly Disagree**
1. On the whole, I am satisfied with myself.	SA	A	D	SD
2. At times I think I am no good at all.	SA	A	D	SD
3. I feel that I have a number of good qualities.	SA	A	D	SD
4. I am able to do things as well as most other people.	SA	A	D	SD
5. I feel I do not have much to be proud of.	SA	A	D	SD
6. I certainly feel useless at times.	SA	A	D	SD
7. I feel that I'm a person of worth.	SA	A	D	SD
8. I wish I could have more respect for myself.	SA	A	D	SD
9. All in all, I am inclined to think that I am a failure.	SA	A	D	SD
10. I take a positive attitude toward myself.	SA	A	D	SD

Figure 1. *The Rosenberg Self-Esteem Scale (RSES)*
NOTE: Source - Rosenberg (1965).

3. Research Questions

We addressed key research question in Chun et al. (2015) to assess the extent to which the RSES is a reliable and valid tool of measuring young adult's perception of self in DPRK, a society where collectivity prevails over the individual. We identified the correlates of self-esteem particularly in DPRK, such as happiness, educational level and social position. We also addressed the research question to identify a set of key factors that account for self-esteem of people in DPRK and extended it to compare with peers in 53 other countries where self-esteem data were available. The focus of the current paper is to further in-depth analysis with our focus on investigating self-liking and self-competence among potential future leaders in the DPRK. To accomplish this, we will use multivariate regression analysis. We leverage data from prior studies that employ the RSES and make cross-national comparison where feasible.

4. Methodology

The PSI developed a self-administered survey that was designed for studying the self-esteem of people in DPRK (see Appendix). The survey form included the RSES as well as a number of questions asking about the demographic background and socioeconomic status of the respondent. The final sample included 259 respondents; item response varied between 202 and 252 participants due to item nonresponse for some questions. The RSES is a Likert-type scale of measuring self-esteem with ten items answered on a four-point scale ranging from strongly disagree (1) to strongly agree (4). Half of the items are positively worded while the other half are negatively worded to prevent any potential response bias. Total scores range from 10 to 40 with a higher score corresponding to a higher level of self-esteem. We use sub-scales of the RSES to measure self-competence and self-liking (Sinclair et al., 2010). Questions 15 to 19 of the survey questionnaire were used to measure self-competence and questions 20 to 24 were used to measure self-liking (see Appendix).

5. Analysis and Findings

5.1 Analysis of Self-Competence and Self-Liking

The sample size of the study was 259, but due to item nonresponse, the sample size for the RSES was 249. The RSES for the 249 DPRK students was calculated using questions 15 to 24 (see Appendix).

As shown in Figures 2 and 3, the response distribution, after removal of the outliers, seems to be normal also for each measure of "self-competence" and "self-liking." A two-tailed T-test has been carried out to compare the mean responses in the two measures "self-competence" (14.06 with SD of 2.04) and "self- liking" (mean of 14.67 with SD of 1.8) which represent two dimensions of global self-esteem. Questions 15 to 19 of the survey questionnaire were used to measure self-competence; Questions 20 to 24, self-liking (see Appendix). The results indicate a statistically significant difference between the two means ($p = 0.05$). Cohen's effect size of -0.328 suggests a small to moderate effect size.

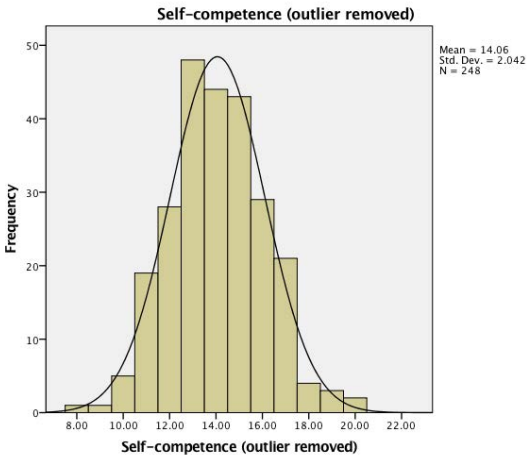

Figure 2. Response distribution of RSES: self-competence

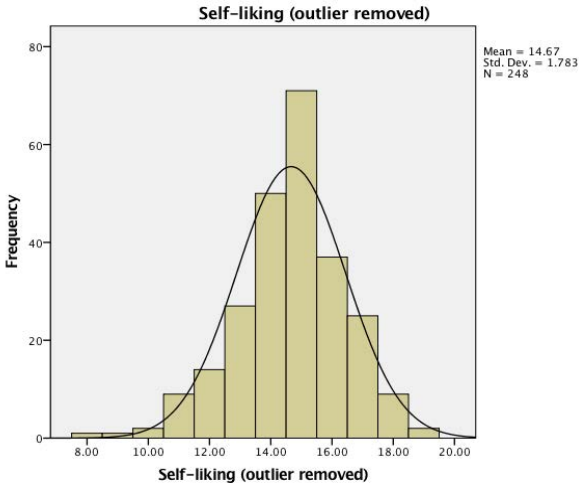

Figure 3. Response distribution of RSES: self-liking

5.2 Self-Competence and Self-Liking of Potential Future Leaders in DPRK

We built models consisting of multiple explanatory variables by leveraging self-esteem literature, the particular context of North Korea, and findings from a series of exploratory models. We tested two sets of models: the first series of models uses the self-competence subscale of the RSES as the dependent variable; the second series uses the 4-item self-liking subscale as the dependent variable.

We remind that the multiple regression analysis conducted for the global self-esteem model showed that health and academic major, with control variables, were found to be the most critical drivers of one's self-esteem among potential future leaders in North Korea. We continued to investigate, using self-competence as the dependent variable. We find that health level is no longer significant, and that factors related to education -- English proficiency and number of math and statistics courses taken-- are the most important correlates of self-competence. This means that the students who reported higher English proficiency or who took more math and statistic courses has higher self-

competence scores on average. It was also found that the fit of the self-competence models was significantly improved by including self-liking as a control variable. The adjusted R-squared of the SC model with other control variables increased from 0.044 to 0.106 when self-liking was added as a control variable (Tables 1, 2).

Table 1: SC full model without SL and with other control variables

Variable	Coefficient	p-value
Intercept	10.92	0.000**
Health level	0.40	0.266
Major	0.66	0.101
Happiness level	-0.02	0.954
English proficiency level	0.67	0.052*
Number of siblings	-0.40	0.267
Age	0.15	0.130
Previous university attended	-0.31	0.439
Number of math/stats courses taken in past 2 years	0.16	0.090*

Note: Adjusted R-squared: 0.044; p-value of F statistic: 0.029

Table 2: SC full model with SL and other control variables

Variable	Coefficient	p-value
Intercept	7.15	0.003**
Health level	0.27	0.443
Major	0.51	0.192
Happiness level	-0.15	0.634
English proficiency level	0.65	0.051*
Number of siblings	-0.49	0.162
Age	0.18	0.068*
Previous university attended	-0.39	0.312
Number of math/stats courses taken in past 2 years	0.17	0.073*
Self-liking	0.29	0.000**

Note: Adjusted R-squared: 0.106; p-value of F statistic: 0.000

The regression outputs of the self-liking models were less conclusive, as no significant explanatory variable was identified except level of self-competence. In contrast to the findings from the self-competence model, academic factors were not clear predictors of self-liking. However, it should be noted that the p-value for happiness level was close to 0.1 in all models in which happiness was included as a factor. This shows that to some extent, one's perceived happiness relative to that of others tend to affect one's sense of worth as a social object. Similar to the self-competence models, the fit of the self-liking models was also improved by including self-competence as a control variable. The adjusted R-squared of the SL

model with other control variables increased from 0.021 to 0.084 when SC was added as a control variable (Table 3, 4). In addition, the analyses indicate that students who have a higher self-liking tend to have higher self-competence and those who have higher self-competence tend to have higher self-liking. This is because the coefficient on self-liking was positive in the self-competence models, and vice versa.

Table 3: SL full model without SC and with other control variables

Variable	Coefficient	p-value
Intercept	12.82	0.000**
Health level	0.45	0.164
Major	0.51	0.157
Happiness level	0.46	0.125
English proficiency level	0.06	0.835
Number of siblings	0.30	0.351
Age	-0.09	0.328
Previous university attended	0.28	0.433
Number of math/stats courses taken in past 2 years	-0.01	0.870

Note: Adjusted R-squared: 0.021; p-value of F statistic: 0.139

Table 4. SL full model with SC and other control variables

Variable	Coefficient	p-value
Intercept	10.23	0.000**
Health level	0.36	0.257
Major	0.35	0.313
Happiness level	0.46	0.110
English proficiency level	-0.09	0.753
Number of siblings	0.40	0.207
Age	-0.13	0.157
Previous university attended	0.36	0.308
Number of math/stats courses taken in past 2 years	-0.05	0.530
Self-competence	0.24	0.000**

Note: Adjusted R-squared: 0.084; p-value of F statistic: 0.001

5.3. Comparison of DPRK Self-Esteem with 53 Nations

RSES consists of 10 items to measure the self-esteem of the respondents. According to Tafarodi & Milne (2002), the 10 items can be equally divided to measure two facets, which are distinguished as self-competence (SC) and self-liking (SL) levels. SC is understood as one's instrumental value and SL as one's intrinsic value. The SC and SL scores were obtained by summing the first five items for SC and the last five items for SL (see Appendix). In the SC bar graph (Figure 4), we can note the contrast between individualistic and collectivistic cultures. Many of the Asian countries, which are considerably collectivistic, are located on the right side of the bar graph, indicating that collectivist societies tend to have a lower SC mean score. Mexico has the highest SC

mean score out of 53 nations, and Japan has the lowest SC mean score. On the contrary, no discrepancy can be found by looking at the SL mean score bar graph (Figure 5), other than North Korea having a relatively high SL mean score. The collectivist and individualistic nations are relatively spread out throughout the graph. Serbia has the highest SL mean score, and Japan has the lowest SL mean score. Once again, for both Figure 7 and 8 the United States, South Korea, Japan, and North Korea's bars have been differentiated for easy comparison.

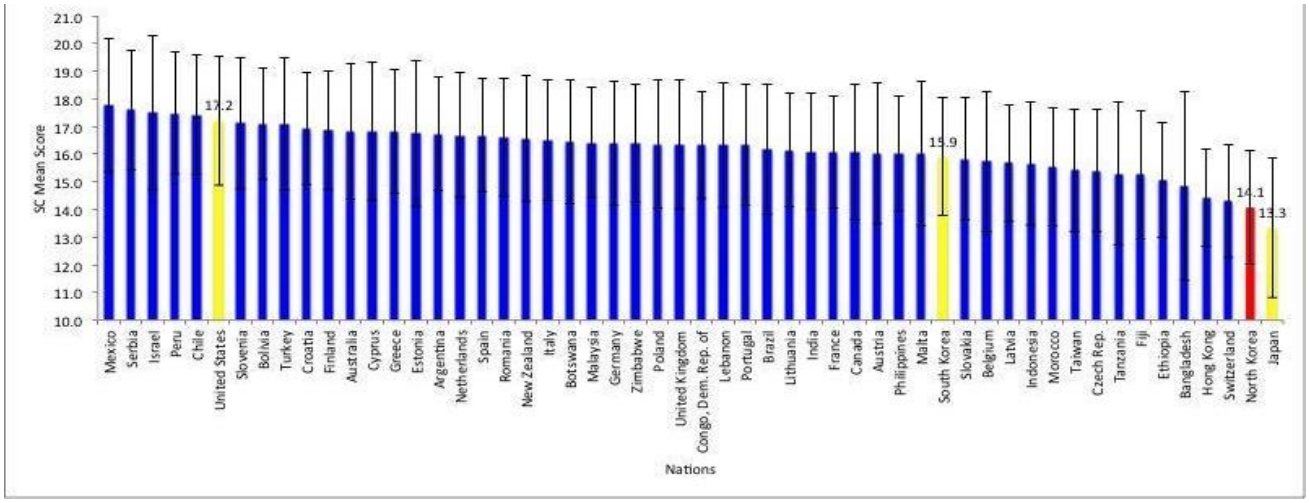

Figure 4. Bar graph of self-competence score of DPRK and 53 other nations. Data are from Schmitt and Allik (2005) and Chun et. al (2015)

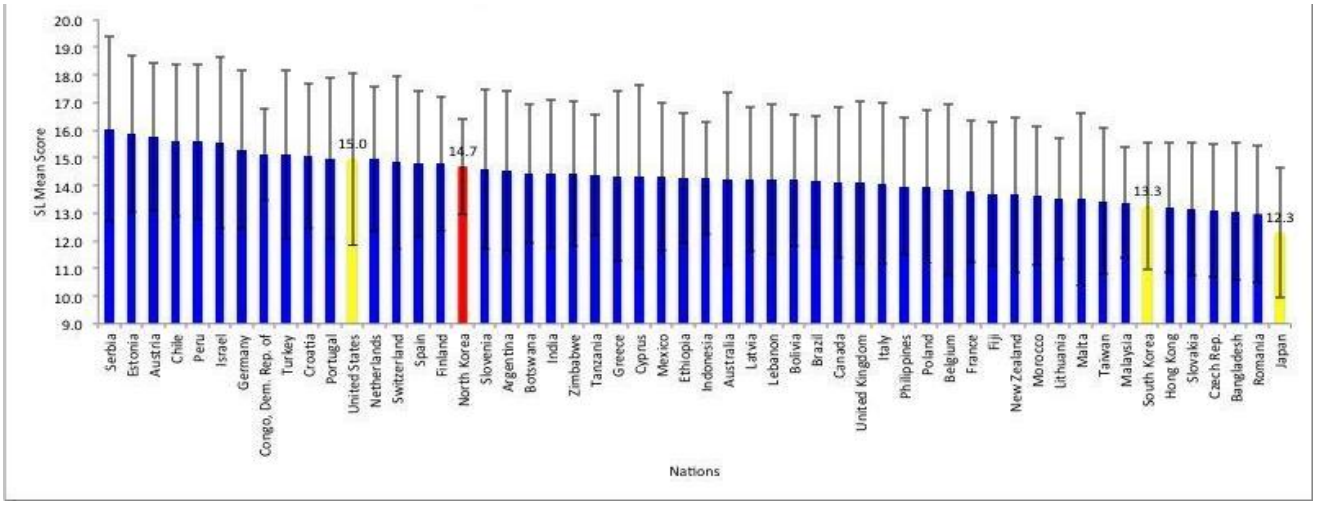

Figure 5. Bar graph of self-liking score of DPRK and 53 other nations. Data are from Schmitt and Allik (2005) and Chun et. al (2015)

6. Discussion and Conclusion

Schmitt & Allik (2005) conducted a study to compare self-esteem across countries and cultures by administering the RSES to 16,998 participants (college students and community samples) in 53 nations. This study evaluated structural equivalence—the possession of similar psychometric properties—of the RSES across a number of cultures. The results provide support for the cross-cultural equivalence of the scale and the comparability between groups.

On the basis of this equivalence, we attempted to compare our results from the DPRK survey with data from the 53 countries presented in the study by Schmitt & Allik. The scores for each of the two self-esteem subcomponents, SC and SL, are close in DPRK (14.06 and 14.67, respectively). As previously mentioned, SC is defined as a sense of personal efficacy and power, whereas SL is the sense of one's own worth as a social object (Tafarodi & Swann, 1995). In this dual approach, the two components are often viewed as competing in the literature. SC has been found to prevail in individualistic cultures (e.g. Australia, Canada, United Kingdom, the United States), in which self-confidence and personal achievement are more important than social harmony, whereas collectivistic cultures (e.g. Bangladesh, Botswana, Chile, Hong Kong) score higher in SL. The latter emphasizes group goals and conformity over individual needs or desires. In DPRK, a collectivist country like its closest neighbors, the score for SL, as expected, exceeds the score for SC. This small difference is statistically significant.

The findings appear to confirm the RSES as a valid measure of self-esteem in DPRK. Analysis of the two subscales of the RSES revealed that potential future leaders in DPRK seem to have higher SL than SC, a trend shown mostly among collectivist countries. Our multivariate regression analysis provided evidence that one's perceived health and academic major are the most critical drivers of self-esteem, and that education alone is the most important driver when it comes to accounting for self-competence among DPRK's potential future leaders. Note that the value of our findings may be constrained by a census of students limited to the only privately-funded international university in DPRK, yet this sort of methodological limitation remains true with most of samples in other countries that were studied and compared with DPRK in this paper.

Acknowledgements

Authors acknowledge and appreciate those students in DPRK who participated in this survey and the international faculty who helped with survey design, data collection and analysis as part of the PSI Institute for data science, survey methodology and interdisciplinary research. We are also grateful to members of American Association for Public Opinion Research, Statistics without Borders of the American Statistical Association, American Evaluation Association, American Association for the Advancement of Science, World Association for Public Opinion Research and of European Survey Research Association whose enduring support behind the PSI Institute made it possible to develop statistical science diplomacy with students and scholars in DPRK.

References

Baumeister, R., Campbell, J., Krueger, J., & Vohs, K. (2003). Does High Self-Esteem Cause Better Performance, Interpersonal Success, Happiness, or Healthier Lifestyles? *Psychological Science in the Public Interest, 4*(1), 1-44.

Chun, A.Y., Myong, C., Kyung, C., Paulson, R., Pennings, J., Won, C., Zafarana, E. (2015). Self-Esteem of Emerging Leaders in North Korea: Challenges and Lessons Learned from the First Self-administered Survey in Country. A Paper Presented at the European Survey Research Association Conference, Reykjavik, Iceland.

Diener, E, & Diener, M. (1995). Cross-Cultural Correlates of Life Satisfaction and Self-Esteem. *Journal of Personality And Social Psychology, 68*(4), 653-663.

Farruggia, Susan P., Chen, Chuansheng, Greenberger, Ellen, Dmitrieva, Julia, & Macek, Petr. (2004). Adolescent self-esteem in cross-cultural perspective: Testing measurement equivalence and a mediation model. *Journal of Cross-Cultural Psychology, 35*(6), 719.

Heatherton, T., & Wyland, C. (2003). *Assessing self-esteem.* American Psychological Association.

Jaret, C., Reitzes, D., & Shapkina, N. (2005). Reflected Appraisals and Self-Esteem.*Sociological Perspectives, 48*(3), 403-419.

Josephs, R., Markus, H., & Tafarodi, R. (1992). Gender and Self-Esteem. *Journal of Personality And Social Psychology, 63*(3), 391-402.

Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton, N.J.: Princeton University Press.

Rosenberg, M. (1979). *Conceiving the self*. New York: Basic Books.

Rosenberg, M., & Pearlin, L. (1978). Social Class and Self-Esteem among Children and Adults. *American Journal of Sociology, 84*(1), 53.

Rosenberg, Schooler, & Schoenbach. (1989). Self-Esteem and Adolescent problems – Modeling Reciprocal Effects. *American Sociological Review, 54*(6), 1004-1018.

Roth, M., Decker, O., Herzberg, P., Brahler, E., & Braehler, M. (2008). Dimensionality and norms of the Rosenberg Self-esteem scale in a German general population sample. *European Journal of Psychological Assessment, 24*(3), 190-197.

Schmitt, D., & Allik, J. (2005). Simultaneous administration of the Rosenberg Self-Esteem Scale in 53 nations: Exploring the universal and culture-specific features of global self-esteem. *Journal of Personality And Social Psychology, 89*(4), 623-642.

Sinclair, S., Blais, M., Gansler, D., Sandberg, E., Bistis, K., & Locicero, A. (2010). Psychometric Properties of the Rosenberg Self-Esteem Scale: Overall and Across

Demographic Groups Living Within the United States. *Evaluation & the Health Professions, 33*(1), 56-80.

Tafarodi, R., & Milne, A. (2002). Decomposing global self-esteem. *Journal of Personality, 70*(4), 443-483.

Tafarodi, R., & Swann, W. (1995). Self-Liking and Self-Competence as Dimensions of Global Self-Esteem – Initial Validation of a Measure. *Journal of Personality Assessment, 65*(2), 322-342.

Tafarodi, R., & Walters, P. (1999). Individualism-collectivism, life events, and self-esteem: A test of two trade-offs. *European Journal of Social Psychology, 29*(5-6), 797-814.

Appendix

Table A.1. *Rosenberg Self-Esteem Scale Used in Survey Questionnaire*

	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
15. I feel that I'm a person of worth, at least on an equal plane with others.	SD	D	A	SA
16. I feel that I have a number of good qualities.	SD	D	A	SA
17. All in all, I am inclined to feel that I am a failure.	SD	D	A	SA
18. I am able to do things as well as most other people.	SD	D	A	SA
19. I feel I do not have much to be proud of.	SD	D	A	SA
20. I take a positive attitude toward myself.	SD	D	A	SA
21. On the whole, I am satisfied with myself.	SD	D	A	SA
22. I wish I could have more respect for myself.	SD	D	A	SA
23. I certainly feel useless at times.	SD	D	A	SA
24. At times I think I am no good at all.	SD	D	A	SA

Economics of Disability to Inform Public Policy: A Case Study of North Korea and its Global Standing

Allison Conners[1], Alan Suh, Paul Chun, Asaph Young Chun
International Strategy and Reconciliation Foundation
Center for Science Diplomacy

1. Introduction

Across the world, families and governments suffer economic losses due to persons living with disabilities. When an individual is unable to work or perform their normal daily tasks as a result of an injury or impairment, they often struggle financially to make ends meet and provide for their families. At the macro level, a country's economy is impacted both by such a reduction in the workforce population, as well as the increased burden on health and social services. The scope of our research is based on the premise that how funds are allocated towards preventive and rehabilitative programs directly impacts the incidence and prevalence of disabilities. This, of course, improves an individual's quality of life, as well as reduces society's economic burden. The first step in informing evidence-based policymaking is a rigorous analysis of disability and workforce data. For our analysis, we have chosen to focus on the Democratic People's Republic of Korea (DPRK), more commonly known as North Korea.

The DPRK is a country often excluded from discussions of disability studies at a global and regional level. Limited data, a reclusive government, and sensationalized media make the DPRK a difficult country to study. Our analysis is undoubtedly hindered by these limitations; however, it also increases the importance of having these discussions. Firstly, it allows us to humanize the people of the DPRK - a society that many of us know very little about and fail to ever think of the daily experiences of the people behind the authoritarian regime. Secondly, facilitating non-politicized discourse on the DPRK encourages the pursuit of improving peace, security and standards of living across East Asia. Lastly, increased statistical analysis and access to data on the country will improve the likelihood for peace and/or reconciliation on the Korean peninsula.

2. Review of Literature

2.1 Quantifying the Economic Burden of Disabilities

Monroe Berkowitz and William Johnson (1970) led one of the largest attempts to quantify a nation's economics burden of disabilities. "Towards an Economics of

[1] Allison Conners, Junior Fellow for Da Vinci Science Diplomacy and Senior Research Coordinator, International Strategy and Reconciliation Foundation Center for Science Diplomacy, www.isr2020.org. You may contact aconners1414@gmail.com or ISRFoundation38@gmail.com if you have questions and inquiries about this paper.

Disability - The Magnitude and Structure of Transfer and Medical Costs" attempted to aggregate and classify all data relating to transfer payments and medical costs in the United States for the year of 1967. The total estimated loss due to disabilities in the U.S. in 1967 was $43 billion (USD), which was approximately 7% of national income (Berkowitz and Johnson, 1970). The paper also explores the rationale behind different transfer payment programs, encouraging further research into whether or not these transfer payment schemes are the most efficient means of addressing the economic burden of disability. Berkowitz and Johnson suggest that future research should focus on establishing criteria to evaluate the adequacy and efficiency of disability income programs (Berkowitz and Johnson, 1970). Furthermore, amalgamating several of these programs may allow for economies of scale to lower total operating costs for these programs.

The key challenge to conducting this study, which remains the biggest barrier to developing evidence-based policy for disabilities, is the lack of existing "health economics" data. As a result, the relationship between increasing spending on rehabilitation and health services and the resulting improved health is unknown. Applying basic microeconomic theory to the health sector, the goal is to estimate the optimal amount of spending on preventive and rehabilitative services so that marginal cost equals marginal benefit (Berkowitz and Johnson, 1970). The system should pay sufficient benefits to allow people to stay out of the workforce as needed to recover from an illness/injury; however, this amount cannot be too much so that it creates disincentive effects. The focus should be on medical and rehabilitative assistance to lessen the time the worker requires off of work and improving safety measures to lessen the occurrence of incidents resulting in injury. Improved access to North Korean "health economics" data is a precondition to any legitimate attempt to quantify the country's economics of disabilities.

The difficulty in studying economics of disability is further compounded by the enormous difficulty in defining the term "disability". In the paper "The Capability Approach and Disability", Sophie Mitra (2006) provides an overview of different conceptual frameworks used to define the term "disability", as well as their implications. Mitra argues that the absence of a universally accepted model to define disability reflects the multi-faceted nature of disabilities and suggests that different contexts may in fact require different models.

One of these models, the capability approach developed by A.K. Sen, provides a framework to examine the vicious circle between poverty and disability. Sen provides a useful framework to examine the complex socio-economic linkages and provides one of the first in depth analysis of the impact of poverty on disabled persons (Mitra, 2006). Prior to this, any existing analysis looked solely at income – equating "economic well-being" to one's income. In reality, this is a much more complex picture. For example, one disabled person may require costly commodities (i.e. wheelchair, hearing aids, etc.), while another does not. Mitra suggests that in order to determine if Social Security benefits in the U.S. (or similar programs in other countries) provide adequate compensation for one's impairment, we need to assess the cost of disability at the individual and the household level (Mitra, 2006). This can be done by focusing on either the cost of illness or the spending patterns of persons with disabilities. Since disability

data is usually self-reported, it is essential that policymakers carefully create questions in questionnaires to learn the specifics of one's work capability in order to address the underlying causes and resulting economic burden of an impairment.

2.2 Economics of Disabilities in the Developing World

The 1990 Global Burden of Disease (GBD) study was the first effort to quantify non-fatal health outcomes across hundreds of disorders at the regional and global level. Two subsequent GBD studies were carried out in 2005 and 2010. The study examined five age groups from both sexes in eight regions of the world (Murray and Lopez, 1994). C.J.L. Murray and A.D. Lopez provide a detailed overview of the methodology and results of the 1990 GBD study in one of four publications in the Bulletin of the WHO entitled "Quantifying Disability: data, methods, and result". The results of the 1990 study indicate that an estimated 85% of the burden of disability was in the developing world (Murray and Lopez, 1994). The studies also revealed enormous discrepancies between self-reported health and the informed estimates produced by the study. Results from the world health survey demonstrate that self-reported disability rates are higher in North America than in Africa (Murray and Lopez, 1994). Meanwhile, the results of the GBD study indicate that Africans have higher YLDs (years lived with a disability) on average than North Americans (Murray et al, 2012). The most likely reason for these discrepancies is the self-reported nature of disability data and the fact that the concept of disability is subject to cultural and societal contexts.

The challenge of informing evidence-based policy in the developing world is further exacerbated by how little disability data and research has been published on these regions. In "Disability Statistics in the Developing World: A Reflection on the Meanings in our Numbers", Glenn T. Fujiura and co-authors examine this gap in disability research and argue that disabilities are likely substantially underreported in developing regions. For example, those who experience a low standard of living and do not have their basic needs met on a consistent basis are much less likely to report, or even acknowledge themselves, that they experience a disability which hinders their quality of life (Fujiura et al, 2005). This finding has important implications for conducting analysis of disability prevalence and incidence across nations. Differences in perceptions have an enormous impact not only the way individuals report their health but also on the way that national governments classify, survey and report on various disabilities. This leads to vast variations in prevalence rates across countries, and is a key limitation to conducting any comparison of disability at the regional or international level.

3. Methodology and Research Questions

3.1 Research Questions

#1 - What are society's economic losses - both at the micro and macro level - due to disabilities in the DPRK?

Individuals with disabilities are often unable to fully perform their professional and

household responsibilities as a result of their impairment. While it is difficult to quantify loss of financial gains from formal, and even more so, for informal work, we hope to analyze these economic losses in depth.

#2 - How does the economics of disabilities in the DPRK compare to other countries?

We intend to compare the prevalence of disabilities in the DPRK with other developing countries. While there are enormous challenges in comparing disabilities across national borders - because of differences in classification, social perceptions, and government priorities - we believe in the merits of comparing existing data to improve the collection, reporting and analyzing of global disability data in the future.

 # 3 - Are there any policy recommendations we can suggest as a result of our data analysis?

The key to evidence-based policy making is applying the results of data analyses to their real world implications. We hope that our research has implications beyond academic study, and contributes to developments in government policies and improvements in the collection and classification of disability data.

3.2 Methodology

The goal of our research is to set the groundwork for further analysis on the economics of disabilities in the DPRK. At this time, there is insufficient access to the data needed to make actual quantifying calculations; however, we are able to perform a thorough analysis of disability and workforce data and make inferences from this data. Our research focuses on analyzing disability and workforce data from the 2008 DPRK Population Census. We then compared this data with health and malnutrition data from the country's 2012 Nutrition Survey. Data from the survey was not yet available in a machine-readable format, so one of our initial steps in the research process was the time-consuming task of transcribing all of the survey data at a summary level. Lastly, we used national census and survey data compiled by the United Nations for over twenty developed and developing countries to compare the DPRK data internationally. This global comparison of disability data reveals not only how the DPRK ranks globally, but also the enormous discrepancies in the classification and stigmatization of disabilities across the world.

4. Overview of Data

For our analysis on the DPRK, we used two sources of data: the 2008 Population Census and the 2012 Nutrition Survey. The 2008 North Korean Population Census was the primary survey data used in our research, specifically for disability and workforce data on

North Korea. The 2008 Census is the country's second population census. Data was collected through house-to-house surveys in October of 2008 and included all North Korean citizens living in the country. The United Nations Population Fund (UNFPA) was involved in the survey and provided technical and material support the country's Central Bureau of Statistics. Our analysis also looks at malnutrition and health data in the DPRK using data from the 2012 Nutrition Survey. The survey was was carried out in the Fall of 2012 by the Central Bureau of Statistics with technical support from UNICEF, WFP and WHO. For the international comparison portion of our analysis, we used data compiled by the United Nations Statistics Division. Both disability and economic data compiled by the UN from national census and survey results are included in our analysis. Similarly, for malnutrition related data, we used childhood wasting and stunting data compiled by UNICEF.

5. Data Analysis

5.1 The Democratic People's Republic of Korea

Over 1.7 million North Koreans reported having a disability in the 2008 Population Census (Central Bureau of Statistics, 2009). This compromises 7.34% of the country's population of over 24 million. If we break this down by gender, females make up a larger portion of the disabled population, compromising 61.8% of reported disabilities (Central Bureau of Statistics, 2009). While the DPRK has not collected, or at least published, data on the geographic distribution of disabilities in the country, the census did reveal that urban dwellers make up a larger portion of the country's disabled population (57.9%). Over a million of the country's urban dwellers identified as having a disability (Central Bureau of Statistics, 2009). Figure 1 visualizes these correlates for the four types of disabilities included in the questionnaire.

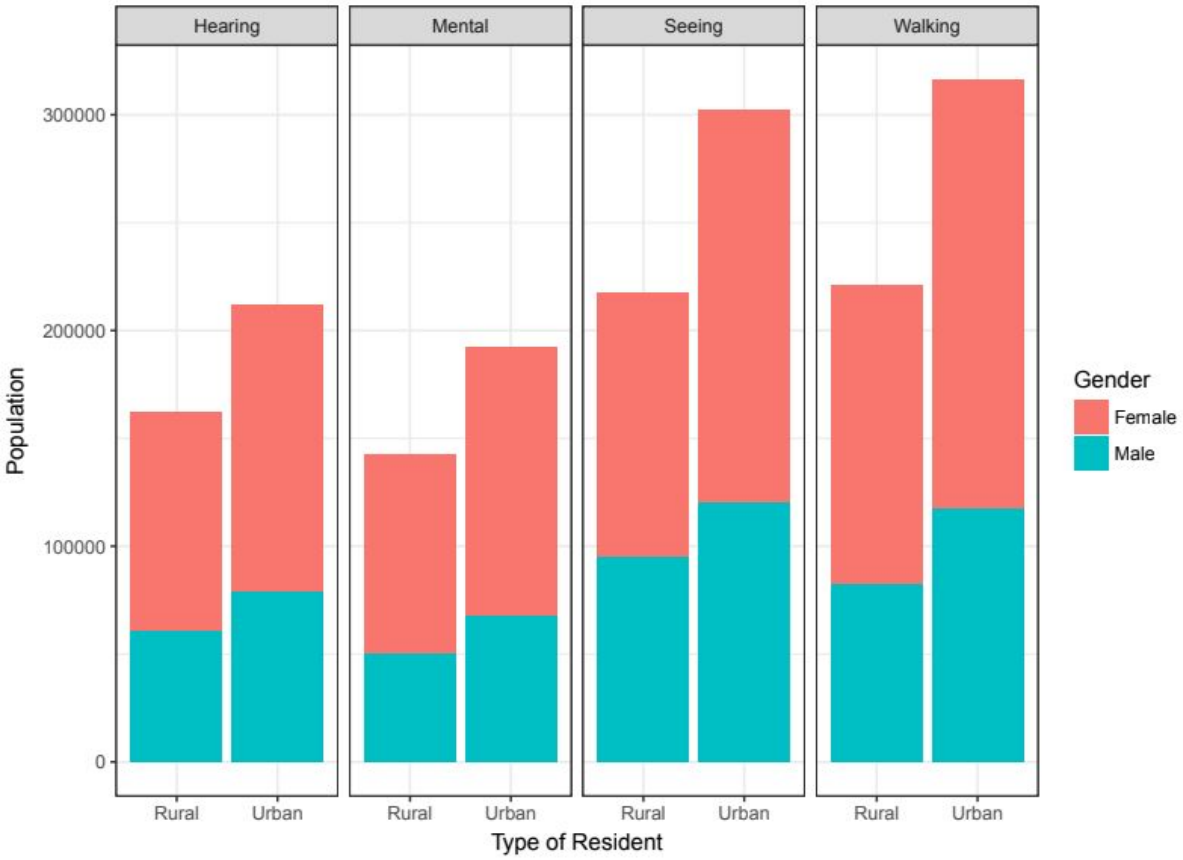

Figure 1: Prevalence of Disabilities in the DPRK
Data Source: Central Bureau of Statistics, 2009

Important inferences can be drawn from this data on the implications for the country's health sector and workforce participation. A higher total number of disabled persons in urban areas indicates that North Korean policymakers should focus more rehabilitative programs, as well as improvements to the accessibility of public spaces in urban areas. Similarly, we can make predictions on the impact of disabilities on certain segments of the workforce. While there is a higher total population of disabled persons in the country's urban regions, this is simply because there are more urban dwellers in the country; 60.6% of North Koreans live in urban areas (Central Bureau of Statistics, 2009). If we look at the figures in proportional terms, however, rural residents in the country have a higher prevalence of disabilities. 8.1% of rural residents said they suffered from a mental or physical impairment as opposed to 7.2% of urban dwellers (Central Bureau of Statistics, 2009).

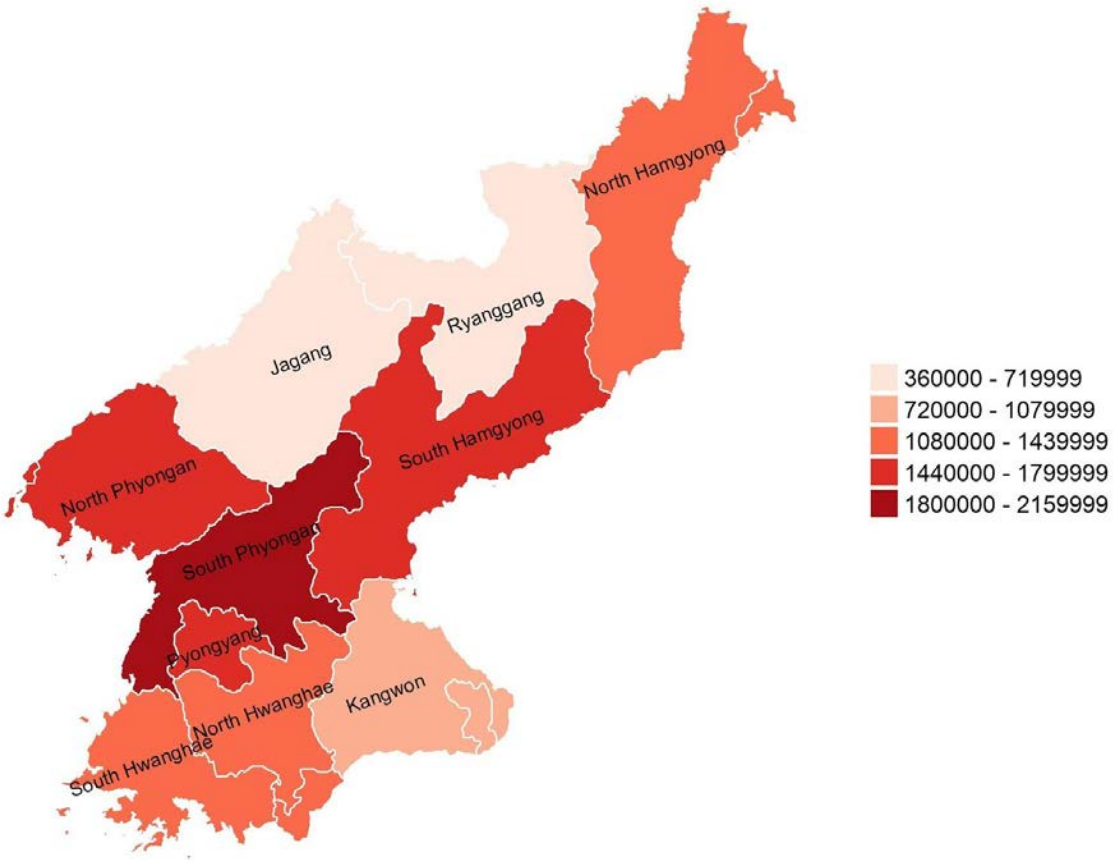

Figure 2: Working Population in the DPRK by Province (> 16 years old)
Data Source: Central Bureau of Statistics, 2009

According to the 2008 Census, North Korea's workforce participation rate is approximately 50.7%. Nearly 12.2 million residents over the age of 16 reported being apart of the country's workforce (Central Bureau of Statistics, 2009). This, of course, does not account for economic activities in the black market nor those who are working below the age of 16. Figure 2 shows the geographic distribution of North Korea's workforce. Pyongyang, South Phyongan, North Phyongan and South Hamgyong have the largest working population in the country. These finds are consistent with the demographic distribution of the population - with the highest concentration of people in the lowlands and plains and smallest concentration in the northern mountainous regions that border China.

Over 4.4 million of the country's workers are employed in "manual labor" type jobs (Central Bureau of Statistics, 2009). This sector of workers - that compromise over 36% of the country's workforce - is more easily impacted by the prevalence of disabilities due to the physical nature of the work. For example, an office may be able to accommodate an employee with an impaired physical or mental condition. A farm or factory, on the

other hand, might hesitate to employ someone whose impairment impacts their ability to safely carry out the physical demands of the job.

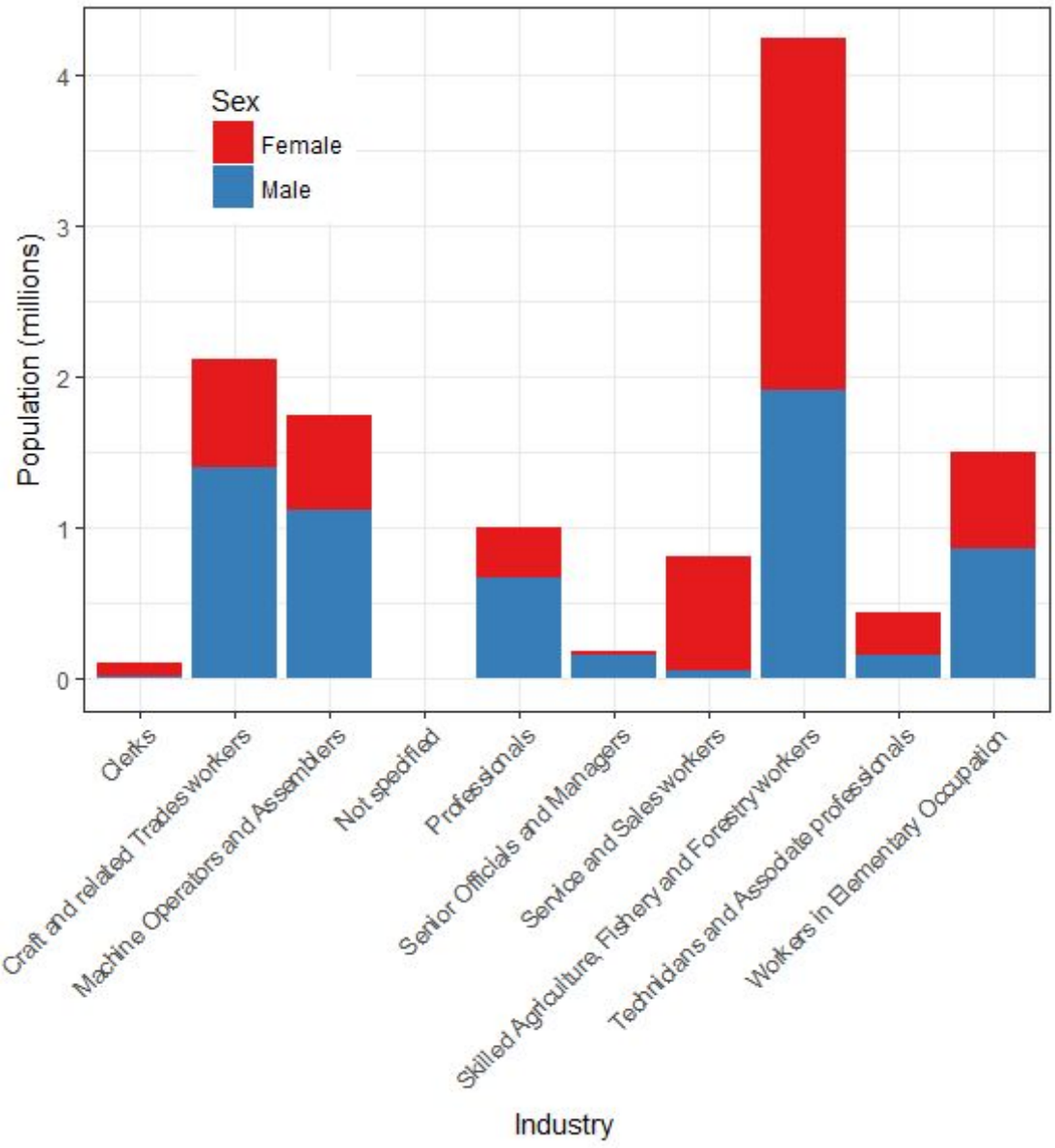

Figure 3: Major Industry in the DPRK by Sex
Data Source: Central Bureau of Statistics, 2009

As shown in Figure 3, skilled agriculture, fishery and forestry workers overwhelmingly compromise the largest major industry in the DPRK. 1.9 million people are employed in these sectors - all of which are predominantly rural-based industries (Central Bureau of Statistics, 2009). The higher prevalence of disabilities among rural dwellers means that this industry will be most vulnerable to increases in the prevalence of incidence of disabilities across the country. Given that their economies are rooted in these industries,

rural communities would also see the greatest economic benefits from improvements in preventive measures.

5.2 Global Standing

Figure 4 shows childhood stunting and wasting prevalence - the primary indicators of acute and chronic malnutrition - along with disabilities for 13 developing countries. For a frame of reference, the WHO estimates that 15% of the global population suffers from a disability (WHO, 2011). All of the 13 developing countries shown, including North Korea, fall well below this average. It is widely reported that disability statistics are significantly underreported in the developing world, and our analysis supports this hypothesis.

Country	Disability (%)	Stunting (%)	Wasting (%)
Zimbabwe	9.1	27.1	3.3
DPR Korea	**7.34**	**19.1**	**2.5**
Colombia	6.4	12.6	0.9
Ecuador	6.1	23.9	1.6
Senegal	5.7	16.5	9
Myanmar	4.6	36	6.6
Cuba	3.2	7	2.4
Angola	2.5	**37.6**	4.9
Thailand	2.2	10.5	5.4
Yemen	2.2	**46.4**	**16.4**
Indonesia	2.1	**36.4**	**13.5**
Nepal	1.9	36	9.6
Philippines	1.6	**33.4**	7.1

Figure 4: Malnutrition and Disabilities in 13 Developing Countries
Data Source: DISTAT and UNICEF Data

Four of these countries - Angola, Yemen, Indonesia and the Philippines - stand out for having a high prevalence of childhood stunting and wasting but very low prevalence of disabilities. Childhood wasting and stunting are the key indicators of malnutrition and it seems unlikely that a society grappling with stunting prevalence as high as 46% in Yemen would have under a 3% disability rate (DISTAT and UNICEF). North Korea has the second highest prevalence of disability among these 13 counties yet its indicators of malnutrition are below the majority of other countries shown. This does not indicate that

malnutrition is not an important issue in North Korea, but rather that the causal links between malnutrition and disability are not clear based on this self-reported data.

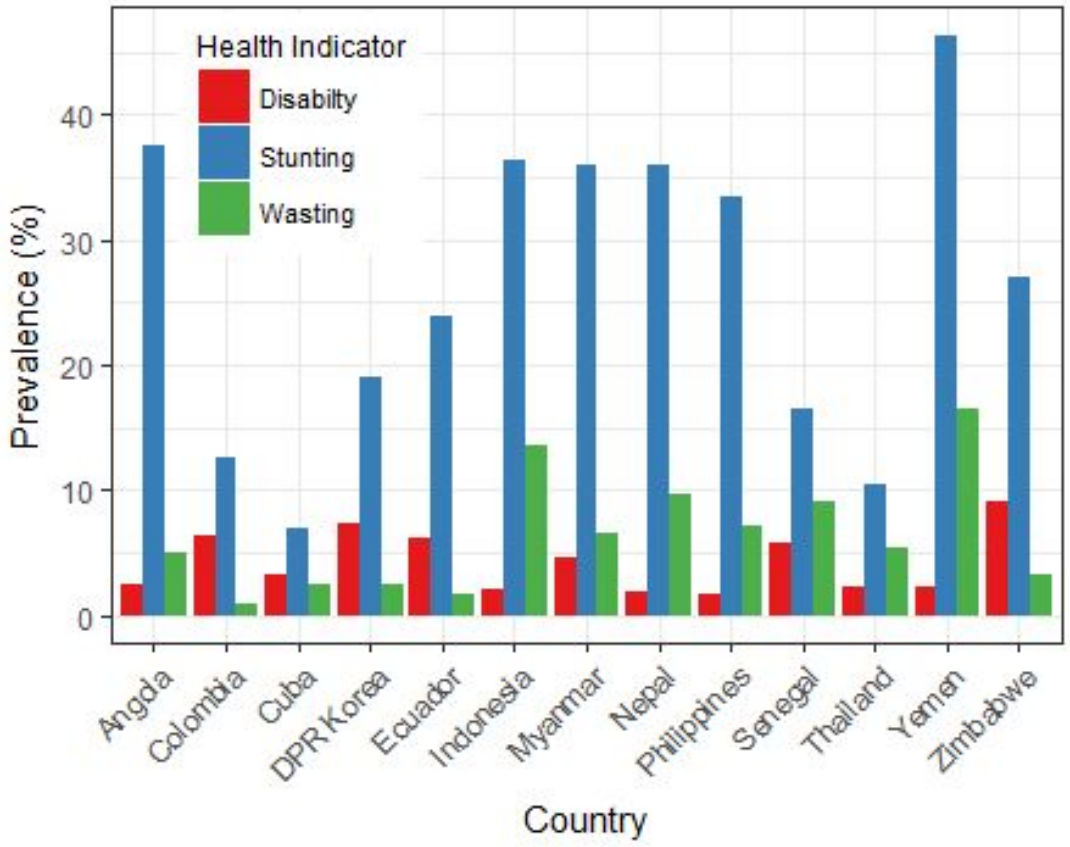

Figure 5: Malnutrition and Disabilities in 13 Developing Countries
Data Source: DISTAT and UNICEF Data

The fact that the countries with higher rates of stunting and wasting appear to report lower prevalence of disability contradicts our understanding of the relationship between inadequate nutrition at young ages and the increased likelihood of the onset of impairments. Figure 6 confirms this hypothesis by revealing a negative correlation between the prevalence of disability and the prevalence of child wasting, which is caused by chronic malnutrition, for the same 13 countries.

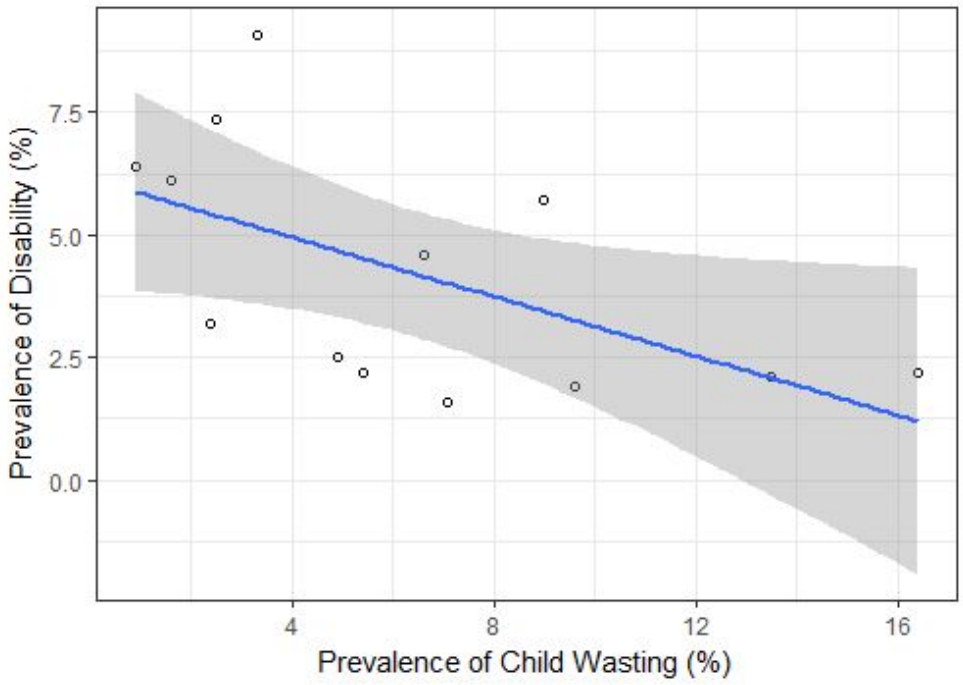

Figure 6: Prevalence of Disability and Child Wasting in 13 Developing Countries
Data Source: DISTAT and UNICEF Data

Figure 7 shows the relationship between prevalence of disabilities and GDP per capita for 41 countries in both developing and developed regions. Countries with higher GDP per capitas typically reported higher rates of disabilities.This positive correlation, however, does not indicate that disabilities are in fact higher in richer countries, but rather that *reported* disabilities are higher. As a result of differences in the classification, acceptance and acknowledgement of disabilities in different regions of the world, enormous discrepancies in the reported rates of disabilities exist.

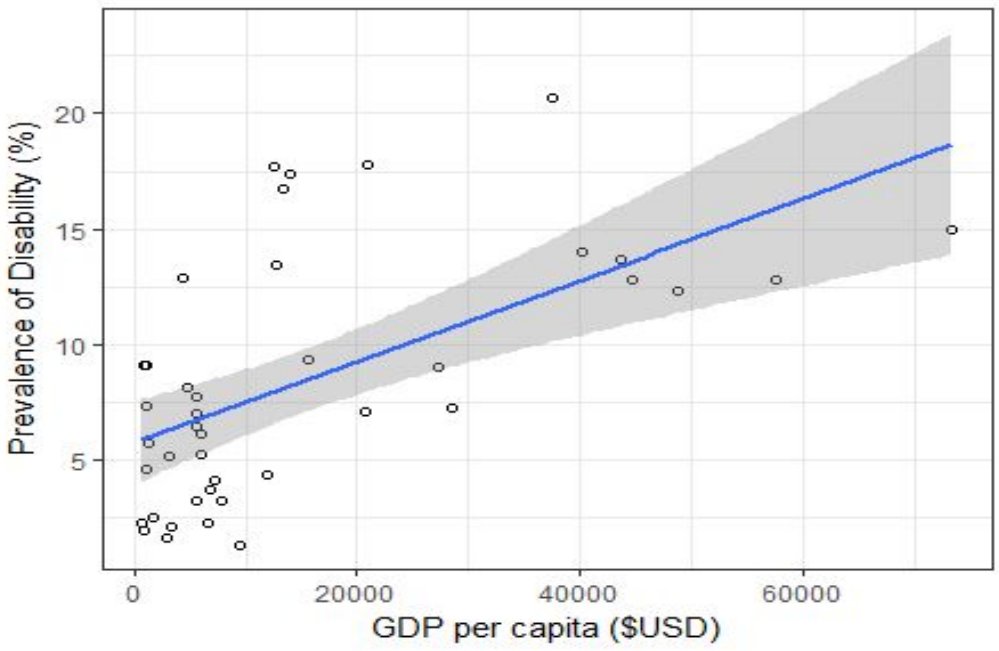

Figure 7: Disability Prevalence and GDP per capita
Data Source: DISTAT and UNSD

Countries with higher standards of living tend to encompass a wide-range of mental illness in their categorization of disabilities. This, in addition to a more general acceptance of disabilities among society, and the existence of social assistance programs to support families, is why disability prevalences are so often reported higher in the developed world. The stigmatization of disabilities and lack of a universal definition not only impacts the daily experiences for disabled persons, but it also influences the classification and reported prevalence of disabilities.This poses an enormous challenge for any attempt to compare disability data globally or regionally.

6. Conclusion

While we were unable to quantify the economic losses of disabilities in the DPRK in this paper, we hope that our research will provide a foundation for further analysis. In order for an in-depth analysis to occur, access to more data on the DPRK is needed. Specifically, data on transfer payment systems, disability insurance and health care use. We also recommend that DPRK policymakers use the same classifications and variables in future Census and Health surveys. This will allow researchers to establish more concrete linkages between health indicators, disability prevalence and workforce participation. In order to improve analysis of global trends of disability prevalence and its linkages to health indicators, a universal term and classification system for disabilities is essential.

References

Berkowitz, Monroe, and William G. Johnson. (1970). “Towards an Economics of Disability: The Magnitude and Structure of Transfer and Medical Costs.” The Journal of Human Resources, 5(3), 271–297. Retrieved from www.jstor.org/stable/144606

Central Bureau of Statistics. (2009). DPR Korea Population Census National Report. Retrieved from https://unstats.un.org/unsd/demographic/sources/census/wphc/North_ Korea/Final%20national%20census%20report.pdf

Central Bureau of Statistics. (March 2013). DPRK Final Report of the National Nutrition Survey 2012. Retrieved from https://www.unicef.org/eapro/DPRK_National_Nutrition_Survey_ 2012.pdf

Fujiura, Glenn T. and Hye J. Park, Violet Rutkowski‐Kmitta. (November 2005). Disability Statistics in the Developing World: A Reflection on the Meanings in our Numbers. Journal of Applied Research in Intellectual Disabilities, 18(4). Retrieved from https://doi-org.libproxy.mtroyal.ca/10.1111/j.1468-3148.2005.00268.x

Mitra, Sophie. (2006). “The Capability Approach and Disability.” Journal of Disability Policy Studies, Vol.16, No. 4, 236–247. Retrieved from https://dx.doi.org/10.2139/ssrn.2330438

Murray, C., C. J., and Lopez, Alan. (1994). Quantifying disability: data, methods and results. Bulletin of the World Health Organization, 72(3). Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2486704/pdf/bullwho00414-0157.pdf

Murray, D., Christopher J L et al. (2012). Disability-adjusted life years (DALYs) for 291 Diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. The Lancet, 380(9859) 2197 - 2223. Retrieved from http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)61689- 4/fulltext

UNICEF Data. Stunting (national and disaggregated). Retrieved from https://data.unicef.org/topic/nutrition/malnutrition/

UNICEF Data. Wasting (national and disaggregated). Retrieved from https://data.unicef.org/topic/nutrition/malnutrition/

United Nations Statistics Division. Table 1.3 Relations among product, income, savings, and net lending aggregates. Retrieved from http://data.un.org/Data.aspx?d=SNA&f=group_code%3A103%3Bitem_code%3A9

United Nations Statistics Division. United Nations Disability Statistics Database

(DISTAT). Retrieved from https://unstats.un.org/unsd/demographic-social/sconcerns/disability/statistics/#/countries

World Health Organization. (2011).World Report on Disability. Retrieved from http://www.who.int/disabilities/world_report/2011/report.pdf