Awakening of the Rational Man? Non-Cognitive Skills After the Storm*

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Abstract

A common assumption in economics is that non-cognitive skills such as personality traits and preferences are fixed within an adult population. The extent to which this assumption holds true is being contested in the more recent empirical literature. We analyze the very short-term causal impact of exposure to one of the most powerful storms ever recorded to strike land on locus of control, reciprocity, and risk preferences for a sample of 2,352 individuals in the Philippines. While we find that post disaster people exhibit significantly higher internal locus of control, lower reciprocity, and lower risk-aversion, effect sizes at the extensive margin are modest. This type of short-term shift towards "rationality" has not been observed before, filling a gap in the emerging literature on the stability of non-cognitive skills and has potential implications for post-disaser response policies. *JEL* Codes: D11, D12, D81.

1 Introduction

Non-cognitive skills play a key role in economic decision models. Stability of personality and preferences over time and their invariance to exogenous shocks has been a fundamental principle in economics (Stigler and Becker 1977). This principle conveniently allows for causal inference of exogenous shocks on important economic outcomes while not bothering about simultaneous changes in non-cognitive skills (Cobb-Clark and Schurer 2013). Systematic instabilities, however, imply biases in empirical inference resulting in potentially poor policy advice.[1] While in recent years, there is growing empirical evidence on the causal impact of exogenous shocks on non-cognitive skills (Schildberg-Hörisch 2018; Chuang and Schechter 2015), the extant literature focuses on rather long-term effects with minimum timeframes of several years or months at best. The very short-term impact has particular relevance in the aftermath of natural disasters. Any impact that extreme adverse events might have on non-cognitive skills in the very short-term could translate into peoples' ability to recover and effect the impact of disaster response policies.

In this paper, we are interested in the very short-term stability of non-cognitive skills subsequent to an exogenous shock within a timeframe of several days and weeks. In answering

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[1]See Cobb-Clark and Schurer (2013) for an excellent account on econometric problems such as endogeneity and errors-in-variables resulting from non-cognitive skill instability and its implications for policy design.

this question, we exploit an exogenous shock to an experimental sample population of 2,352 individuals in the Philippines to the most powerful storm ever recorded to strike land at that time (Schiermeier 2013) to estimate its immediate causal impact on locus of control, reciprocity, and risk preferences. Typhoon Haiyan coincidentially split our sample population into 54.68 percent of observations before (up to thirty days) and 45.32 percent of observations after the typhoon (up to twenty-three days). We apply stated and revealed preference measures[2], that have been validated in a developing country context assuring precision in our measurement of non-cognitive skills (Chuang and Schechter 2015). We apply the different concepts used in economics and psychology on non-cognitive skill stability. While the strict definition of stability in economics implies that individuals' personality and preferences are constant over time, psychologists require non-cognitive skills to be stable with regard to its rank order (Schildberg-Hörisch 2018). Understanding both types of stability is important in our context because changes in rank order may mask important effects not observable at the average level, thus providing means to improve disaster response policies. To the best of our knowledge, no extant study analyzes this type of immediate impact of exogenous shocks in a clean randomized before/after setting that we have.

With regard to the standard economics perspective on the stability of non-cognitive skills we find that post disaster people on average feel that they have more control over things happening to them, are less reciprocal, and less risk-averse. An interpretation of the increase in internal locus of control and the decrease in reciprocity is that people become "more rational" in terms of normative as oposed to behavioral decision models. Our interpretation is in line with some social scientists ideas that self-interested reactions prevail in life-threatening situations (Kelley et al. 1965; Mintz 1951; B. S. Frey, Savage, and Torgler 2010). While any attitude towards risk in our stated and revealed measures of risk aversion could be rationalized by a utility function (Samuelson 1947), the relatively high levels of risk aversion we observe in our sample population imply that people would forego risky but profitable economic activities that could help them recover. The direction of the observed effects could be rationalized by a systematic decline in available resources due to the destruction caused by the typhoon that triggers an increase in competition among peers and makes risk-sharing at the village level (Chiappori et al. 2014; Deaton 1992; Gertler and Gruber 2002; Ligon 1998; Ligon, Thomas, and Worrall 2002; Townsend 1994) less feasible. The reduction in reciprocity may further be fueled by the asymmetry of information with regard to damages suffered that can be exploited as excuses to break social contracts between agents (Fleming, Chong, and Bejarano 2014). Turning to the psychology perspective on non-cognitive skill stability, we find that the rank order with regard to gender, age, and education in general is stable before and after the typhoon. This is indicative of a relatively homogeneous impact on average levels of non-cognitive skills. Locus of control, however, appears to be rank-order instable with regard to years of education.

The findings of this study have potential implications for designing effective post-disaster policies based on an increased understanding of changes in personality and preferences caused by severe external shocks. While the long-run positive impact of an internal locus of control on

[2]See Mata et al. (2018) for a discussion of stability and validity of stated and revealed preference approaches to measuring risk prefernces.

coping with health (Schurer 2017) and unemployment shocks (A. Becker et al. 2011; Caliendo, Cobb-Clark, and Uhlendorff 2014) has been documented, we find that severe external shocks evoke a tendency towards internal locus of control, potentially helping affected populations to recover. Reciprocity within a community afftected by a natural disaster has been found to be a crucial factor in the creation and consolidation of safety nets that facilitate economic recovery (Fleming, Chong, and Bejarano 2014; Akbar and Aldrich 2017; Knack and Keefer 1997). The lower levels of reciprocity and expected reciprocity from peers after a severe shock observed in our data reduces the potential benefit of mutual support to recover. The propensity to take risks has been shown to be an important driver of economic prosperity (Levhari and Weiss 1974; Shaw 1996). The observed reduction in risk aversion could help post-disaster recovery by promoting entrepreneurial activities and investment in risky but profitable ventures (e.g., new agricultural technology).

Our results contribute to the emerging literature on the stability of personality and preferences. While much of the existing empirical research supports personality stability (Cobb-Clark and Schurer 2012; Milojev, Osborne, and Sibley 2014), preferences seem to be more susceptible to individual experiences (Cassar, Healy, and von Kessler 2017; Malmendier and Nagel 2011). Little rigorous analysis exists on the stability of locus of control in an adult population. The recent study by Cobb-Clark and Schurer (2013) provides a notable exception showing that changes in locus of control are moderate after important life events in representative survey data. To the best of our knowledge, there is no literature on causal effects of natural disasters on locus of control. Empirical evidence on the impact of natural disasters on pro-social preferences is inconclusive. Becchetti, Castriota, and Conzo (2017) and Fleming, Chong, and Bejarano (2014) provide support for a negative impact of severe shocks on pro-social traits, while Cassar, Healy, and von Kessler (2017) and Whitt and Wilson (2007) provide opposite findings. The evidence on how large exogenous shocks such as the natural disaster considered in this study affect the propensity to take risks also is highly inconclusive. The recent review of the literature by Chuang and Schechter (2015) and more recent research concludes that the impact of natural disasters on risk aversion can be positive (Cameron and Shah 2015; Cassar, Healy, and von Kessler 2017; Chantarat et al. 2016; Liebenehm, Degener, and Strobl 2018; van den Berg, Fort, and Burger 2009), negative (Bchir and Willinger 2013; Eckel, El-Gamal, and Wilson 2009; Hanaoka, Shigeoka, and Watanabe 2017; Kahsay and Osberghaus 2017; Page, Savage, and Torgler 2014), or inconsistent (Said, Afzal, and Turner 2015; Willinger, Bchir, and Heitz 2013). Schildberg-Hörisch (2018) suggests that the contrarian results are potentially driven by the application of measures of risk aversion, which have been developed for highly educated and literate populations in developed countries, to developing country sample populations (see also Vieider forthcoming; Chuang and Schechter 2015). The measures we apply in this study have all been either developed for less educated and partly illiterate populations in developing countries or tested within such populations. A further general problem with inference in the existing literature on personality and preference stability is the difficulty of identification. Most studies rely on data collected post-disaster only, potentially biasing treatment effects in unknown direction and magnitude. We argue that our randomized before/after setting does not suffer from such problems. We contribute to the literature on personality and preference stability by providing evidence on immediate short-term changes subsequent to a large exogenous shock on locus of control, reciprocity, and risk preferences. The analysis is particularly valuable because of the joint observation of three cardinal traits in high temporal resolution of several days and weeks that was not available previously. As we add a new time dimension, previous findings on long-term effects are not necessarily inconsistent with ours.

The remainder of this paper proceeds as follows. In Section 2, we introduce the data and methodology including a detailed description of typhoon Haiyan and its geographical as well as temporal relation to our data collection. Section 3 provides the main results on treatment effects of the typhoon and in Section 4 we conclude.

2 Data and Methodology

2.1 Data

Our sample of 2,352 individuals from the Philippines is composed of participants from two fully randomized artifactual field experiments in the Iloilo and Guimaras provinces that were conducted in October and November 2013. While the data we analyze in this study are taken from two distinct studies (Biener, Landmann, and Santana 2017; Biener et al. 2018), the geographical area, the timing of data collection, and the randomization procedure were identical across the two studies. Participants were rural villagers, which were sampled using a two-stage randomization schedule, first by randomly sampling villages and then by selecting participants for the selected villages in the second stage. Households were randomly chosen from within a village using complete household lists to which we had unrestricted access. We required participants to be between 18 and 65 years of age.

Typhoon Haiyan made landfall in the Philippines late on November 7, 2013, and reached our experiment region around noon on November 8, while data collection was paused during November 7 to 10. Haiyan was the most powerful storm ever recorded to strike land at that time (Schiermeier 2013). The Philippine National Disaster Risk Reduction and Management Council reported fatalities of over 6,300 people, with greater than 28,000 people injured, and over 1,000 people still missing in 2015 (Republic of the Philippines 2015). Figure 1 shows the typhoon trajectory and treatment assignment conditional on the respective experimental village visited before (green) or after the typhoon (red). We have 1,286 (54.68 percent) observations before and 1,066 (45.32 percent) observations after the typhoon.

To measure locus of control, reciprocity, and risk preferences we rely on standard approaches that have been used and validated in a developing country context before. Locus of control is measured by a 2-item questionnaire that has been applied in empirical studies in India (Cole, Sampson, and Zia 2011), which is also strongly related to the locus of control measure used, for example, in Cobb-Clark and Schurer (2013).[3] Locus of control represents "a generalized attitude, belief or expectancy regarding the nature of the causal relationship

[3] The folowing statements were evaluated by participants based on a 7-point likert scale: (1) "I have little control over what will happen to me in my life", and (2) "Good things tend to happen to other people, not to me or my family."

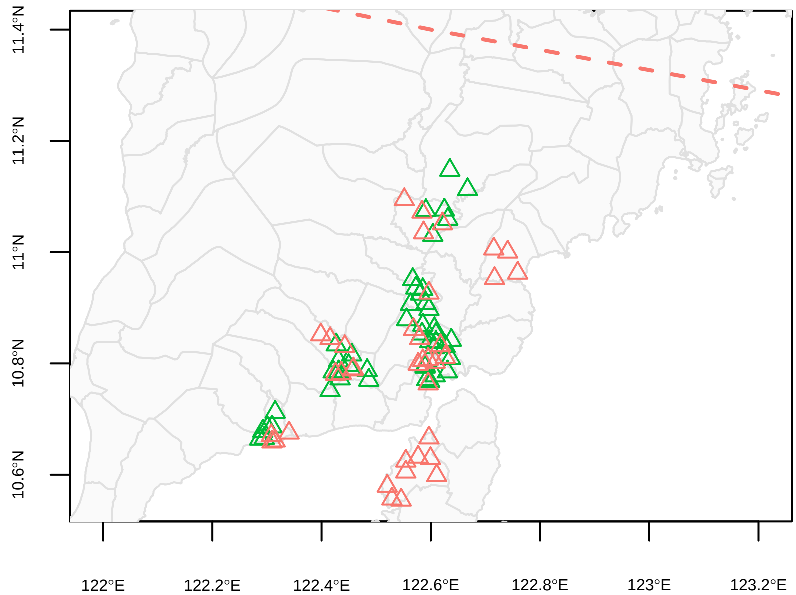

Figure 1: Typhoon trajectory and treatment assignment.

Note: The figure shows the islands of Panay and Guimaras located in the western part of the Visayas region of the Philippines. The colored triangles represent the villages where the experiments were conducted, while green represents pre-typhoon and red post-typhoon experiment dates. The dashed red line shows the actual typhoon trajectory on November 8, 2013.

between one's own behaviour and its consequences" (Rotter 1966) with those believing that life's outcomes are due to their own efforts having an internal locus of control and those believing that outcomes are due to external factors such as luck having an external locus of control (Cobb-Clark and Schurer 2013; Gatz and Karel 2016).

Reciprocity is measured by the *beliefs in reciprocity* 8-item questionnaire construct developed by Perugini et al. (2003). It can be understood as an internalized conditional personal motivation or norm.[4] We also include a measure of expected reciprocity from others in a similar vein as Becchetti, Castriota, and Conzo (2017) look at giving and expected giving.[5]

Risk aversion is measured based on a stated preference 3-item questionnaire (Donthu and Gilliland 1996; Bruner 2015)[6] and a revealed preference choice measure of risk aversion

[4]The folowing statements were evaluated by participants based on a 7-point likert scale: (1) "To help somebody is the best policy to be certain that s/he will help you in the future", (2) "I do not behave badly with others so as to avoid them behaving badly with me", (3) "I fear the reactions of a person I have previously treated badly", (4) "If I work hard, I expect it will be repaid", (5) "When I pay someone compliments, I expect that s/he in turn will reciprocate", (6) "I avoid being impolite because I do not want others being impolite with me", (7) "If I help others, I expect that they will thank me nicely", (8) "It is obvious that if I treat someone badly s/he will look for revenge."

[5]"To what extend do you believe you would receive support in case of an emergency by the following people on a scale from 1 to 5 with 1 being "doesn't apply at all" and 5 being "applies completely": (1) relatives within barangay, (2) friends within barangay, (3) relatives outside barangay, (4) friends outside barangay, (5) neighbors, (6) barangay officials."

[6]The folowing statements were evaluated by participants based on a 7-point likert scale: (1) "I avoid risky

following Binswanger (1980) and Binswanger (1981). We ask participants to choose among six 50:50 cash lotteries varying in risk and expected return with the propensity to take risk increasing with the choice number. The Binswanger (1980) revealed preference measure was developed for an application in rural India and has been applied to comparable populations numerous times (e.g., Cole et al. 2013).

For the measurement of personality, we used the 10-item short version of the Big Five personality inventory including an additional third agreeableness item, namely "Is considerate and kind to almost everyone" introduced in Rammstedt and John (2007). The resulting 3-item agreeableness scale increases validity and correlation to more comprehensive measurement scales. This personality inventory has been applied to a broad range populations from developed and developing countries (Rammstedt, Kemper, and Borg 2013). All questionnaires and choice tasks were systematically translated from English to the local language Hiligaynon by applying the forward and blind back-translation method involving two groups of Hiligaynon speakers also fluent in English. The items were subsequently pre-tested in the sample target population and adapted where needed.

2.2 Mean-level stability

The typhoon was a shock to a random part of our experimental sample population that was unexpected for large parts of the population until at least two days before landfall of the typhoon[7], thus we estimate the treatment effect of being exposed to the typhoon or not on the traits Y locus of control, reciprocity, and risk preference as follows:

$$Y_i = \beta_0 + T_i\beta_1 + \epsilon_i.$$

T_i is the treatment indicator taking the value 1 if the observation is after the typhoon and 0 if the observation is before the typhoon, while ϵ_i is the error term corrected for clustering at the village level. In adition, we estimate the effect of being "strongly affected" as opposed to being "mildly affected" conditional on $T_i = 1$. The latter categorization is based on the mean wind speed exceeding 88 km per hour at the village level (signifying allocation to the "strongly affected" group). This threshold is in line with official "storm" classifications and equivalent to a 10 or higher in Beaufort scale. The village-level wind-speed measure is also highly predictive for an individual-level survey measure of perceived affectedness[8], explaining

things", (2) "I only make a decision when I think I can predict the outcomes", (3) "I would rather be safe than sorry."

[7]The storm became a typhoon on November 5, 2013 and was forecasted to hit the Philippines (JTWC 2014). The Philippine National Disaster Risk Reduction and Management Council as well as the Philippine Atmospheric, Geophysical and Astronomical Service Administration started issuing public alerts on November 6 and President Benigno Aquino made an appearance on television on November 7 to highlight the warnings (GIZ 2014).

[8]The folowing statements were evaluated by participants based on a 7-point likert scale: (1) "On a scale from 1 to 7, where 1 means not affected and 7 means strongly affected, how badly were you affected by the storm?", (2) "On a scale from 1 to 7, where 1 means no damage and 7 means totally destroyed, how badly was your house damaged?"

roughly 45 percent of the variance.

A potential concern with this identification strategy is that the infrastructure damage of the typhoon didn't allow us to visit the strongly affected areas with equal probability to the less strongly affected areas leading to a correlation between treatment assignment and severity of the typhoon, which could potentially be correlated with our outcome variables. Indeed, we had to make some adjustments to our randomization schedule, taking out some of the most severely affected areas and including those affected less severe. However, we can see in the data that the mean wind speed at the village level during the typhoon is only slightly lower (-3.006 km/h, p=0.095) for the treated group. We use non-parametric propensity score matching with mean wind speed during the typhoon at the village level as an instrument taking into account that propensity scores are estimated (Abadie and Imbens 2016) to account for this imbalance. We also estimate treatment effects based on a subsample excluding the province of Guimaras, which was only included after the typhoon because damages to infrastructure were less severe.

2.3 Rank-order stability

Rank-order stability in our setting implies consistency in the rank ordering of groups of people with certain characteristics according to the level of a given trait before and after the typhoon (Schildberg-Hörisch 2018). In other words, those groups of people exhibiting the highest value of a certain trait before the typhoon tend to exhibit the highest value with regard to this trait after the typhoon. Analyzing rank-order stability thus provides insights into the question of whether some groups of people are effected differently by the typhoon as opposed to others. We consider heterogeneous treatment effects for gender, age, and years of education, which are itself fixed ex-ante and should thus be unaffected by the typhoon in terms of both mean-level stability and rank-order stability.[9]

In particular, we estimate differences in correlations between the individual characteristics with our traits of interest locus of control, reciprocity, and risk preference before and after the typhoon. The following linear model is estimated via OLS for each trait Y locus of control, reciprocity, and risk preference:

$$Y_i = \beta_0 + X_{ik}\beta_k + X_{ik}T_i\beta_{kt} + \epsilon_i.$$

X_{ik} represents the vector of the k individual characteristics, while T_i is again the treatment indicator taking the value 1 if the observation is after the typhoon and 0 if the observation is before the typhoon. The estimates β_{kt} for the interaction terms $X_{ik}T_i$ can thus be interpreted as the difference in regression point estimates before and after the typhoon, indicating changes in rank order. ϵ_i is the error term corrected for clustering at the village level. A comparable approach would be to estimate seemingly unrelated regressions to identify systematic changes, leading to identical results.

[9]In Table A1 of the Appendix we show that this assumption holds empirically in our data.

3 Results

3.1 Mean-level stability

Table 1 shows the baseline values as well as the treatment effects of the typhoon for the three traits of interest locus of control, reciprocity, and risk preferences and Figures 2 and 3 show the development of traits over time relative to the the arrival of typhoon Haiyan. The presentation of results is consistently at the village level, implying that all standard errors are corrected for clustering at this level. Our results show that experiencing the typhoon significantly affected all three traits in a direction that could be interpreted as "more rational."

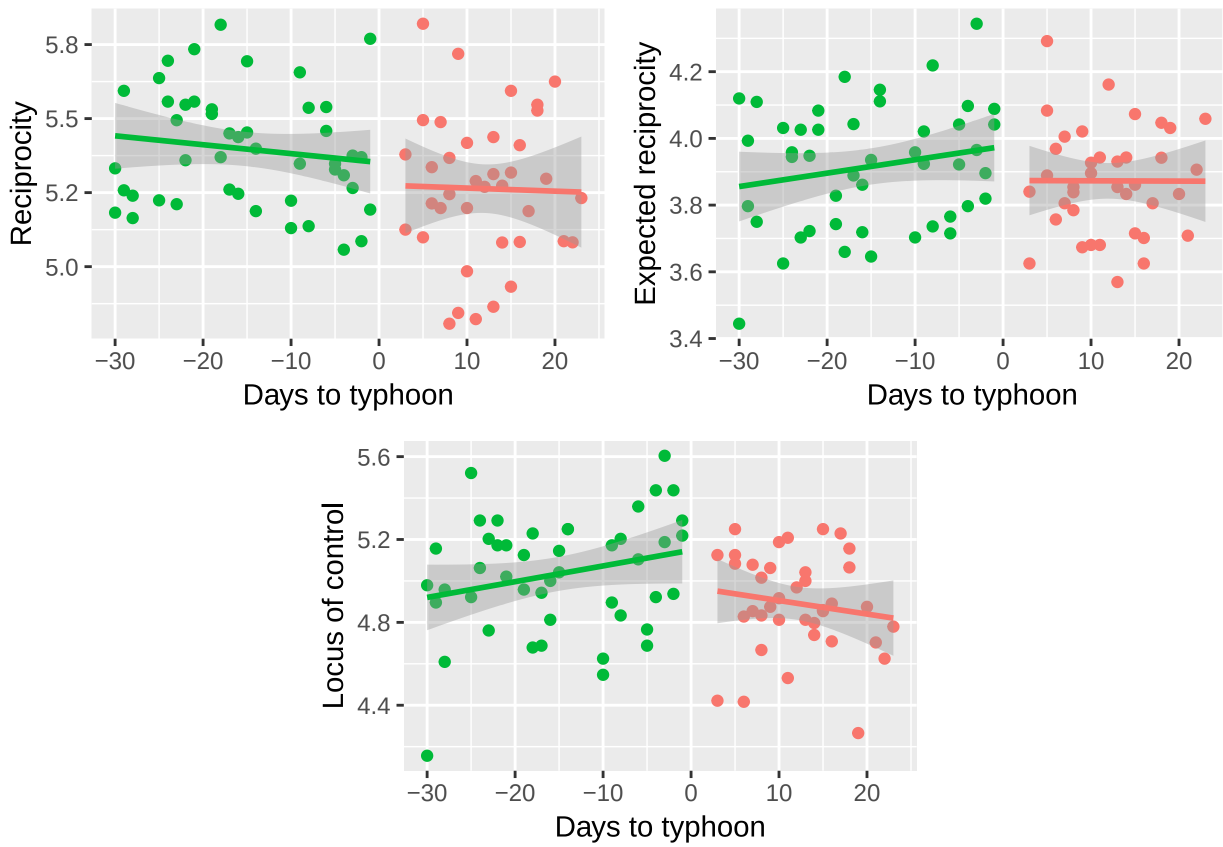

Figure 2: Development of locus of control and reciprocity over time.

Note: The dots represent the mean values at the village level. The lines represent linear OLS regressions with 95 percent confidence intervals. The time dimension represents the days to landfall of typhoon Haiyan in our experimental region (i.e., negative values indicate days before and positive indicate days after).

The participants that took part in our experiments after the typhoon have a higher internal locus of control (-0.147, p=0.011), meaning that they belief that their lifes' outcomes are relatively more driven by their own efforts as opposed to external factors. The effect size is not statistically different between those strongly and those only mildly affected by the typhoon (-0.028, p=0.761). This is an original result for which there is no benchmark in the

Table 1: Summary statistics and treatment effects.

	Total before	Total after		Strong-Mild	
	OLS	OLS	ATE	OLS	ATE
Panel A: locus of control					
Locus of control	5.031***	-0.147**	-0.141**	-0.028	0.062
(scale: 1 to 7)	(0.042)	(0.058)	(0.065)	(0.092)	(0.129)
Observations (cluster)	1,286 (46)	1,066 (38)	1,066 (38)	1,066 (38)	1,066 (38)
Panel B: reciprocity					
Reciprocity	5.399***	-0.117**	-0.13***	-0.125	-0.152*
(scale: 1 to 7)	(0.029)	(0.049)	(0.046)	(0.083)	(0.092)
Observations (cluster)	1,286 (46)	1,066 (38)	1,066 (38)	1,066 (38)	1,066 (38)
Expected reciprocity	3.925***	-0.044	-0.057	-0.081	-0.115
(scale: 1 to 5)	(0.027)	(0.037)	(0.041)	(0.051)	(0.079)
Observations (cluster)	1,286 (46)	1,066 (38)	1,066 (38)	1,066 (38)	1,066 (38)
Panel C: risk preference					
Risk avoidance	5.653***	-0.148**	-0.169***	-0.066	-0.095
(scale: 1 to 7)	(0.038)	(0.063)	(0.058)	(0.108)	(0.113)
Observations (cluster)	1,286 (46)	1,066 (38)	1,066 (38)	1,066 (38)	1,066 (38)
Binswanger (1980)	3.659***	0.207**	0.161*	-0.08	-0.013
(scale: 1 to 6)	(0.058)	(0.086)	(0.094)	(0.091)	(0.164)
Observations (cluster)	734 (23)	610 (19)	610 (19)	610 (19)	610 (19)

Notes: The treatment effect of the typhoon is estimated via OLS with the dependent variable the respective trait and the independent variable the typhoon dummy (1 if after typhoon, 0 if before typhoon). We also show propensity score matching estimates of average treatment effects (ATE) follwoing Abadie and Imbens (2016). The last column presents the difference between those strongly affected by the typhoon and those affected relatively mildly conditional on being in the treatment group after the typhoon. The allocation to the strongly affected group is signified if mean wind speed exceeds 88 km per hour in the respective village; this definition is in line with official "storm" classifications and equivalent to a 10 or higher in Beaufort scale. Standard errors (reported in parentheses) are corrected for clustering at the village level.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

extant literature. Somewhat related is the analysis of changes in locus of control following labour market, health, or demographic events for which Cobb-Clark and Schurer (2013) find modest evidence.

Reciprocal traits are significantly lower immediately after the typhoon (-0.117, p=0.017), while this result seems to be driven mostly by those strongly affected even though the

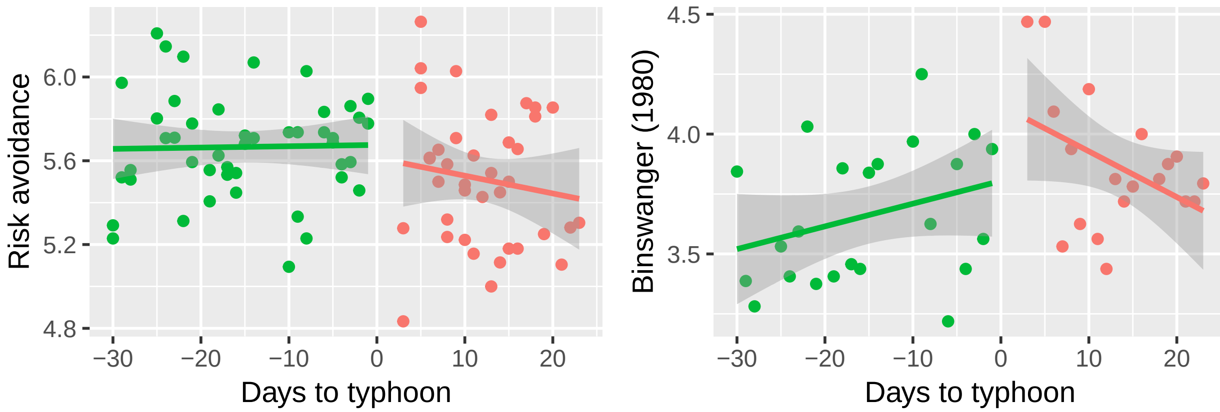

Figure 3: Development of risk preference over time.

Note: The dots represent the mean values at the village level. The lines represent linear OLS regressions with 95 percent confidence intervals. The time dimension represents the days to landfall of typhoon Haiyan in our experimental region (i.e., negative values indicate days before and positive indicate days after).

difference in treatment effects between the strongly and mildly affected populations is not statistically significant (-0.125, p=0.133) or only slightly significant considering the propensity score matching results (-0.152, p=0.098). It is interesting to see that individuals own decrease in reciprocity after the typhoon is to some extend reflected in their assessment of expected reciprocity from others' as those strongly affected expect significantly less reciprocal behavior from others (-0.097, p=0.041). This is in line with long-term observations in Fleming, Chong, and Bejarano (2014), who observe lower reciprocity in earthquake affected areas in Chile a year after the event. Related is also Becchetti, Castriota, and Conzo (2017), who find lower levels of giving and expected giving in dictator games for tsunami affected populations in Sri Lanka seven years after the event.

The two different measures of risk preference we included in our study are both significantly and consistently impacted by the typhoon. The survey measure of risk avoidance is significantly lower after the typhoon (-0.148, p=0.02) implying an increase in the proclivity to take risks. The choice based measure provides similar evidence for a reduction in risk averison as the riskiness of the chosen lottery is higher on average after the typhoon (0.207, p=0.016). Differences in treatment effects between those strongly and mildly affected are again not statisctically significant (p=0.538 and p=0.378 respectively). All treatment effects are robust to the exclusion of the less severely affected province of Guimaras, which we included only after the typhoon.

Taken together these results imply short-term mean-level instability caused by the exposure to the typhoon with higher internal locus of control, lower reciprocity, and higher proclivity to take risks.

3.2 Rank-order stability

Table 2 shows the linear regression estimates for the interaction between individual sociodemographic characteristics and years of education with the typhoon dummy variable only. With regard to the sociodemographic characteristics the impact of the typhoon is homogeneous implying a stable rank-order with regard to gender and age. Neither are females affected differently then men, nor are older people affected differently then younger people.

Table 2: Typhoon treatment effect on rank order.

	Locus of control	Reciprocity	Expected reciprocity	Risk avoidance	Binswanger (1980)
T x Gender	0.16	0.099	0.034	-0.08	-0.11
(1=female, 0=male)	(0.145)	(0.107)	(0.103)	(0.152)	(0.182)
T x Age	-0.004	0.001	-0.006	0.008	-0.005
(scale: 18 to 65)	(0.006)	(0.004)	(0.004)	(0.006)	(0.007)
T x Years of education	0.062***	0.007	-0.02	0.008	-0.037
(scale: 0 to 14)	(0.023)	(0.018)	(0.016)	(0.021)	(0.034)
Observations (cluster)	2,352 (84)	2,352 (84)	2,352 (84)	2,352 (84)	1,344 (42)

Notes: The table shows OLS estimates of the interaction between individual characteristics and the typhoon dummy T (1 if after typhoon, 0 if before typhoon); the estimates can thus be interpreted as the difference in regression point estimates before and after the typhoon. Standard errors (reported in parentheses) are corrected for clustering at the village level.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Locus of control appears to be rank-order instable with regard to years of education. While individuals with more years of education exhibit higher internal locus of control before the typhon, this does not hold after the typhoon, where we do not find any statistically significant differnences in terms of locus of control between those with more years of education and those with less years of education. The average impact of the typhoon on locus of control thus seems to be driven mostly by those lower in years of education moving in the direction from external locus of control to internal locus of control. While for those with less years of education the “wake-up call” effect of the typhoon (i.e., in terms of higher internal locus of control) seems to be stronger relative their more highly educated peers, the impact of the typhoon on reciprocity and risk preferences is not different, meaning they are also less reciprocal and risk avoident.

4 Conclusion

In this study, we exploit unique data to estimate short-term changes in the three cardinal traits of locus of control, reciprocity, and risk preferences caused by a large exogenous shock in high temporal resolution of several days and weeks that was not available previously. We contribute to the emerging literature on preference and personality stability by adding a new time dimension, rendering our findings relevant also for the evaluation of post-disaster response policies.

We identify significant moderate mean-level instabilities in locus of control, reciprocity, and risk preferences subsequent to exposure to the strongest tropical storm ever recorded at landfall in a rural population in the Philippines. In particular, we find that post disaster the feeling of control over things happening to peoples' lives is more pronounced, the willingness to reciprocate others' kindness is lower, and the proclivity to take risks is higher. These effects are relatively homogeneous across sociodemographic characteristics, cognitive skills, and personality traits with some exceptions, implying a general stability in rank-ordering. The finding that people exhibit a higher internal locus of control and a lower level of reciprocal preferences can be interpreted as evidence for a mindset more in line with normative as oposed to behavioral decision models. The relatively high levels of risk aversion we observe in our baseline data imply that people would forego risky but profitable economic activities. The positive impact of the typhoon on the willingness to take risks is fortunate in the post-disaster setting as it allows the affected population to take risks helping to recover faster economically from the shock.

The results of our study are encouraging to some extend when we consider the higher post-disaster internal locus of control and proclivity to take risks, potentially helping affected populations to recover faster. The role of internal locus of control has been documented to positively impact recovery from idiosyncratic shocks such as health (Schurer 2017) and unemployment (A. Becker et al. 2011; Caliendo, Cobb-Clark, and Uhlendorff 2014) and the propensity to take risks has been shown to be an important driver of economic prosperity (Levhari and Weiss 1974; Shaw 1996) in general. Post-disaster policy interventions could exploit these changes promoting entrepreneurial activities and investment in risky but profitable ventures (e.g., new agricultural technology). The lower levels of reciprocity and expected reciprocity from peers after a severe shock observed in our data are unfortunate because reciprocity within a community afftected by a natural disaster has been found to be a crucial factor in the creation and consolidation of safety nets that facilitate economic recovery (Fleming, Chong, and Bejarano 2014; Akbar and Aldrich 2017; Knack and Keefer 1997). On a broader sense, our result are in line with a stream of research in the social sciences relating self-interested behavior in life-threatening situations to overriding pro-social preferences and social norms (B. S. Frey, Savage, and Torgler 2010).

5 References

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6 Appendix

Table A1: Typhoon treatment effect on mean level and rank order.

	Gender	Age	Years of education
Intercept	0.879***	47.748***	11.288***
	(-0.005)	(0.078)	(0.001)
Typhoon	0.031	-1.091	0.09
(1=after, 0=before)	(0.116)	(1.861)	(1.861)
Gender		-1.89**	0.239
(1=female, 0=male)		(1.406)	(0.338)
Age	-0.003**		-0.045***
(scale: 18 to 65)	(0.065)		(0.008)
Years of education	0.005	-0.733***	
(scale: 0 to 14)	(0.004)	(0.126)	
T x Gender		0.038	-0.236
		(1.185)	(0.295)
T x age	-0.001		0.001
	(0.002)		(0.011)
T x years of education	-0.005	0.078	
	(0.007)	(0.177)	
Observations	2,352	2,352	2,352
Cluster	84	84	84

Notes: The table shows OLS estimates of the relationship between the individual characteristics. It includes the interaction between characteristics and the typhoon dummy T (1 if after typhoon, 0 if before typhoon); these estimates can thus be interpreted as the difference in regression point estimates before and after the typhoon. Standard errors (reported in parentheses) are corrected for clustering at the village level.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.