

## **Adaptation to treatment.**

### **Evidence from a disabled sample in Uganda**

*(Draft paper)*

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**ABSTRACT.** We empirically investigate the relationship between adaptation, aspirations and life satisfaction for a sample of disabled people in Uganda. Adaptation theories claim that people tend to adapt to their conditions and to adjust their aspirations accordingly, so that agents are always on a “Hedonic Treadmill” and satisfaction is only transitory (see e.g. Brickman and Campbell, 1971, Frederick and Lowenstein, 1999). We implement a randomized control trial in Kampala, Uganda, where a random sample of disabled people is provided with medical equipment for lower limbs disabilities (June 2012). This represents the treatment group, composed of 233 people. A control group of 115 people were assessed and interviewed to be treated one year later (June 2013). Both the treatment and control group are interviewed four, nine and twelve months after the intervention. On the impact evaluation side, the hypothesis we test is that the treatment should increase the patients’ mobility and well-being, so life satisfaction in the short run. However, two other effects are possible: an increase in their aspirations, which could translate in disappointment if not fulfilled, decreasing life satisfaction; and an adaption effect to the new condition in the medium-long run, which would make life satisfaction return to its original level. Preliminary results show that in the first four months after the intervention the patients treated experience an increase in life satisfaction compared to the control group, despite significant only for females. However, we also find evidence of partial adaptation already after ten months from the intervention: from the first to the second follow-up (four to ten months after the treatment) life satisfaction of those treated starts to slightly decrease, still remaining higher than the original level. One year later (June 2013), life satisfaction has almost returned to the original level.

## **1 Introduction and related literature**

In psychology hedonic adaptation refers to the phenomenon for which people adapt to stimuli that are affectively relevant, and it can involve cognitive other than sensory stimuli. Adaptive processes are considered important for the individuals because they protect the organism by diminishing the internal impact of external stimuli (Frederick and Lowenstein, 1999). Persistent strong hedonic state has been demonstrated to cause destructive psychological and also physiological consequences. Adaptation can increase the awareness of one’s status, and prevent the expenditure of energy by the organism in attempts

to change something not changeable, in order to redirect motivation to feasible changes. Hedonic adaptation “*provides the serenity to accept the things one cannot change, the courage to change the things one can, and the wisdom to know the difference*” (Frederick and Lowenstein, 1999). One of the first to model hedonic adaptation was Helson (1964). An individual’s hedonic state is a function of the difference between the current stimulus level and the adaptation level, where the adaptation level is the average of past stimuli levels. Frederick and Lowenstein (1999) incorporate the importance of time in causing adaptive processes, claiming that most recent events may have a larger impact on adaptation than oldest ones: adaptation level is a weighted average of past stimuli levels, with recently experienced stimuli receiving greater weight. Further modifications can be developed, for example assuming that the speed of adaptation is larger for gains than for losses (see e.g. Strahilevitz and Lowenstein, 1998; Kahneman and Varey, 1991). Also, it seems possible that adaptation may depend on the anticipation of future stimulus levels (“feedforward”) (see e.g. Van Praag et al., 1977, 1988), so people find it less difficult to adapt to a negative event if they knew about it in advance. The fact that adaptation occurs for both bad and good things led Brickman and Campbell to develop the concept of “hedonic treadmill” (Brickman and Campbell, 1971). People are constantly on a hedonic treadmill because of adaptive processes, so that satisfaction for some events is only transitory, and eventually the individual becomes indifferent or even dissatisfied. The fact that people seem to return to a baseline level of satisfaction after adaptation to a certain status occurs has led some authors, mainly in the psychological literature, to claim that people have a genetic “set point” of satisfaction, from which they can temporarily move but to which they return in the long-run (see e.g. Lykken and Tellegen, 1996).

## 1.1 Adaptation and aspirations in the economic literature

In economics adaptation has been studied mainly in conjunction with the concept of aspirations. When adaptation occurs, individuals adjust their aspirations according to the new conditions to which they adapted. Aspirations are usually assumed to be endogenously determined by adaptation, social comparison, and external factors (see e.g. Gilboa and Schmeidler, 2001; Stutzer, 2004). Individual well-being is defined as a weighted function of the difference between objective payoffs and aspirations levels, where aspirations levels are linear function of preceding objective payoffs. An increase in objective payoffs has a direct and indirect effect: the direct effect is to increase well-being, and the indirect effect is to increase the aspiration levels in future periods, which reduce well-being. The relationship between aspirations and well-being is however not obvious. Aspirations can be influenced by for example education and exposure to information, other than adaptation and social comparisons. Also, there could be a possibility of reverse causality, so that individuals with higher aspirations can obtain higher objective payoffs because they are more ambitious. Furthermore, it seems reasonable to assume that the speed and

extent of adaptation depend on the intensity of the event. Empirical evidence about adaptation shows indeed that people tend to adapt quite easily to changes in income, but more difficultly to unemployment or disability. However the empirical evidence is still quite rare. Stutzer (2004) uses two datasets from Switzerland to analyze the role of income aspirations in individual happiness. They find evidence of adaptation and the negative effect of aspirations: the higher the income, the higher the income aspirations; the higher the income aspirations, the lower life satisfaction. Adaptation to income and to status is then investigated by Di Tella et al. (2010). Using a longitudinal German dataset (GSOEP), they compare adaptation to income versus adaptation to status, and adaptation to gains versus adaptation to losses. They find evidence that people adapt to income but not to status: status has a positive effect on SWB and its effect does not wear off over time, while the effect of income last approximately four years. Moreover, comparing losses versus gains there is little evidence of a stronger effect of losses, and that loss aversion affects only males. Empirical evidence in developing countries is still very rare as well. Examples are Knight and Gunatilaka (2012) in China, and Barr and Clark in South Africa (2009). Both of them use the theoretical framework developed by Stutzer (2004) and find adaptation to income and a negative effect of income aspirations on life satisfaction. Also, Knight and Gunatilaka (2012) find that aspirations are increasing in income, education, age and health, and that in China males have higher income aspirations than females. However both Barr and Clark (2009), and Knight and Gunatilaka (2012) provide cross-sectional analyses, so they cannot control for potential reverse causality.

## 1.2 Disability and adaptation

Disability is one of the most widely studied life events in the literature about adaptation. Albrecht and Devlieger (1999) provide evidence of what they call “disability paradox”. This refers to two findings: many people with disability report to have good or even excellent quality of life; and non-disabled people predict a very low level of well-being for disabled individuals. One of the most cited papers about disability and SWB is the one by Brickman et al. (1978) where they compare SWB of lottery winners versus accident victims, and conclude saying that the latter are not so much dissatisfied than the former, so there is evidence of adaptation to disability. In the psychological literature several works have been shown that disabled people report a quite high level of SWB or slightly slower than healthy people, concluding that people can adapt to events like a disability onset. However all of them are based on cross-sectional analysis so the pre-change levels of SWB are unknown. Also, SWB reported by disabled people, despite higher than what healthy people predict, is usually lower than that of healthy people, with a great discrepancy in case of severe or multiple disabilities. Lucas (2007) explores the effect of long-term disability on SWB using two longitudinal panel surveys (GSOEP and BHPS), and find that life satisfaction of long-term disabled falls dramatically at the disability onset and remains significantly below the average even after several years. A

similar work in economic literature is developed by Oswald and Powdthavee (2008), who use the British panel survey (BHPS) to study adaptation to disability. They find evidence of only partial adaptation (between 30% and 50% depending on the severity of disability), and that on average disabled people not only report a lower mean of life satisfaction than non-disabled after the onset, but also before. Similar results are found by the authors using the GSOEP<sup>1</sup>. The only attempt to study the impact of disability on SWB in a developing country is the one by Fafchamps and Kebede (2008) in Ethiopia, to the best of our knowledge. They cannot find evidence of adaptation to disability, which has a significant negative effect on life satisfaction irrespective of the time elapsed since the onset. Moreover, disability is associated with a lower objective well-being, and this reduction in the material welfare is shared by all the members of the household. Indeed, disability is found to reduce life satisfaction not only of the disabled person, but also of all the members of the household. However, the analysis is based on cross-sectional data, and longitudinal data should be required to provide stronger evidence.

We implement a randomized control trial in Kampala, Uganda, where a random sample of disabled people is provided with medical equipment for lower limbs disabilities (June 2012). This represents the treatment group, composed of 233 people. A control group of 115 people were assessed and interviewed to be treated one year later (June 2013). Both the treatment and control group are interviewed also four and nine months after the intervention. The contribution of the paper is twofold: enriching the empirical evidence about the relationship between adaptation, aspirations and life satisfaction, with data from a developing country; and evaluating the impact of an exogenous shock (i.e. the provision of equipment to disabled people) on life satisfaction. On the impact evaluation side, the hypothesis we test is that the treatment should increase the patients' mobility and well-being, so life satisfaction in the short run. However, two other effects are possible: an increase in their aspirations, which could translate in disappointment if not fulfilled, decreasing life satisfaction; and an adaption effect to the new condition in the medium-long run, which would make life satisfaction return to its original level. The paper is organized as follows: section 2 explains the data and descriptive statistics; section 3 contains the results of the impact evaluation; section 4 concludes.

## 2 Data

The first wave of the project (June 2012) involved 233 disabled treated and 115 controls to be treated one year later (June 2013). All of the patients were interviewed through an extensive questionnaire which collected information about their disability and medical history, and socio-demographic

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<sup>1</sup> The works by Lucas (2007) and Oswald and Powdthavee (2008) despite using the same dataset provide slightly different results. This is due to different econometric technics used in the psychology versus economics literature.

characteristics. In relation to subjective well-being variables measuring the patients' mental health, emotional consequences of disability, life satisfaction and aspirations were collected. A short version of the questionnaire was then implemented by telephone four and nine months after the first waves. One year later, in June 2013, all the patients were invited to come back to be reassessed (treatment) or treated (control). Due to some attrition rate, the final sample in June 2013 was composed by 259 patients, of whom 171 treatment and 88 control. Appendix A contains the summary statistics of the main demographic variables at the beginning of the project. The sample is composed overall by 58% of males and 42% of females, with an average age of 41 years old. The individuals involved in the trial are quite poor in comparison to the urban population: the average household income is about 300,000 UGX (about £120) per month; according to the 2009/10 Uganda National Household Survey, the average monthly income in Kampala is about 960,000 UGX and in urban areas overall about 660,200 UGX<sup>2</sup>. In terms of other demographic characteristics, most of them are married (39%), monogamously or polygamously, or cohabitate, but a large proportion has never married (26%). Similarly to the national figure, self-employment represents the most frequent employment status (48%). Educational levels of our sample are very similar to the urban population patterns: only few of them do not have education at all, and the majority report to have completed the secondary school (61%), with also a quite large proportion of people with an educational level higher than secondary. Almost all of them are religious, with Catholicism representing the larger group, immediately followed by Protestantism and Muslimism. The main source of disability is polio (62%), followed by road accident (7%). Other sources of disabilities are infection, injection, gunshot or not specified diseases. About half of the sample has been disabled since childhood, with an average length of disability of 28 years. Subjective well-being is measured as satisfaction with life on a 7-points scale, where 0 means completely dissatisfied and 7 completely satisfied. Overall, the patients report very low level of life satisfaction. Fig.1 shows the distribution of life satisfaction at the beginning of the project, in June 2012. About one third of the respondents report a level of life satisfaction equals to two. The average level of life satisfaction is 3.36, much lower than western countries (where it is usually higher than 5), but not much lower than the national mean (3.88)<sup>3</sup>.

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<sup>2</sup> Source: Uganda National Household Survey, 2009/10.

<sup>3</sup> Source: World Database of Happiness. The value 3.88 is obtained normalizing the original value 4.8 from a 0-10 points scale to the 1-7 points scale. Average of two surveys conducted between 2000 and 2009.

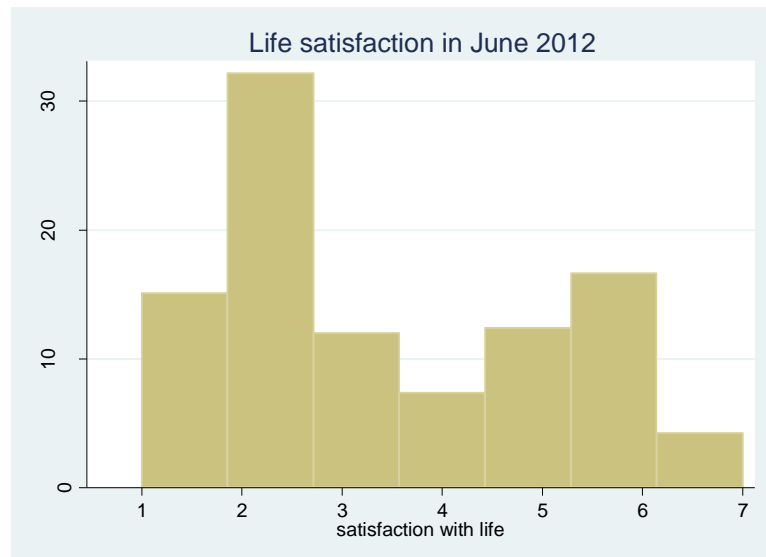


Figure 1 – Life satisfaction at the beginning of the project (June 2012)

In terms of treatment and control groups, the two samples have similar socio-demographic characteristics. For each of the main variables the t-test reveals that the means of two groups are not statistically different (see Appendix A).

### 3 Impact evaluation

One year after the intervention, most of the people treated reported to have experienced an improvement in their mobility; 75 per cent reported to use the equipment everyday while a minor proportion only for certain activities; however, about 12 per cent of them experienced some problems with the equipment provided so they stopped using it. A medical assessment has been done to the patients before and after the intervention in order to measure the impact of the treatment on their mobility<sup>4</sup>. A medical questionnaire called SF-8 based on a self-assessment has also been implemented in order to capture the impact of the intervention. It is a questionnaire developed by Quality Metric to assess the physical and mental components of health status, and it has extensively used in medical research and validated in African countries. The SF-8 is composed by eight categorical questions assessing the physical and emotional well-being of the patients in the last four weeks.<sup>5</sup> It ranges from 0 to 800 with higher number indicating greater well-being. The figure below shows the pattern of the SF-8 for the treatment and control group in the four waves:

<sup>4</sup> Medical data are still to be entered. Further details will be provided in an updated version of the paper.

<sup>5</sup> See Appendix B for details.

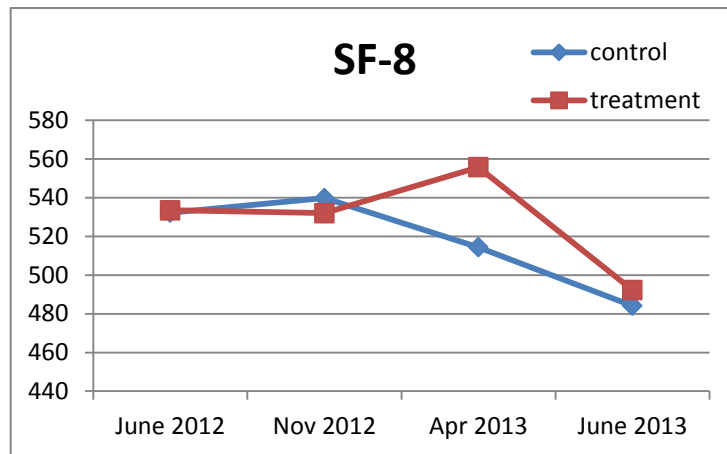


Figure 2 – Physical and emotional well-being (SF-8)

The treatment group has experienced a significant improvement in overall well-being in the first months after the intervention compared to the control group; however, the last wave shows a large decrease for those treated one year before, reaching a level even lower than the original one. One possible explanation for this is the possibility that the patients treated last year answer strategically in order to receive further treatment, underestimating their level of well-being. Objective indicators of medical conditions from the medical assessment will reveal whether there has been indeed an improvement or not.

It seems reasonable to assume that the level of life satisfaction follows the change in the patients' overall well-being, *ceteris paribus*. Fig. 2 shows the pattern of life satisfaction for the two groups over time. The treatment group has experienced a large increase in life satisfaction in the first months immediately following the intervention; however, from the November 2012 to April 2013 it starts slightly to decrease, crossing the level of the control group, despite being still higher than the original level. In June 2013, life satisfaction of those treated one year before has come back almost to the original level, and it is now lower than the one of the control group, despite not significantly. In one year, it seems thus that the patients have almost totally adapt to the treatment.

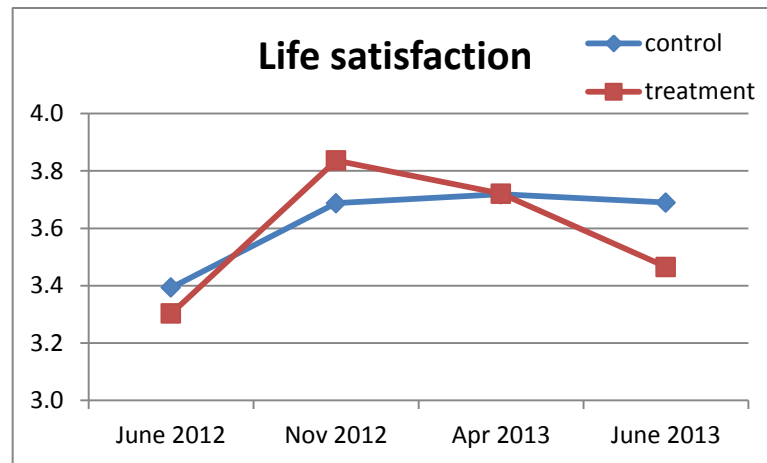


Figure 3 – Life satisfaction on a 7-points scale

A possible explanation for the phenomenon of adaptation can be attributed to the change in aspirations caused by the treatment. As summarized in the literature review, adaptation can be due to a change in aspirations, which have a negative effect on life satisfaction. Following the previous empirical literature (see e.g. Stutzer, 2004, Knight and Gunatilaka, 2012, Barr and Clark, 2009), income aspirations have been measured as the level of income considered sufficient to live well. This is a categorical variables taking five values<sup>6</sup>, and it refers to household income per month. The range of the possible answers goes from less than 50,000 UGX to more than 200,000 UGX. Income aspirations have been asked only in the first and last wave (June 2012 and June 2013). Fig. 4 shows the proportion of patients choosing the highest level of income considered sufficient to live well (>200,000 UGX per month) in June 2012 and 2013. The proportion of those choosing the highest category has significantly<sup>7</sup> increase from last year for the treatment group, while in the control group it has remained almost the same.

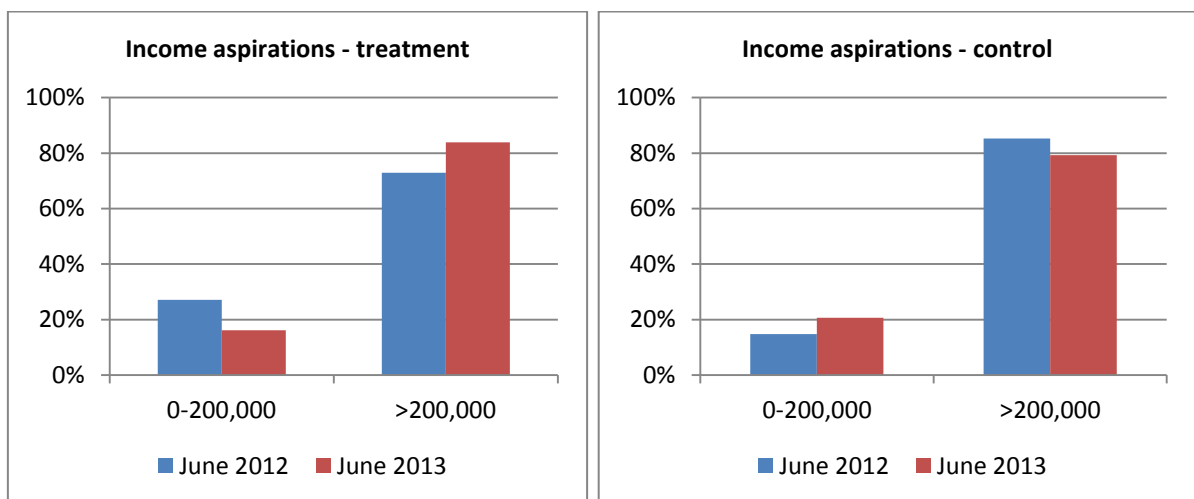


Figure 4 - Change in income aspirations (sufficient income to live well)

<sup>6</sup> Income ranges (UGX): 0-50,000; 50,000-100,000; 100,000-150,000; 150,000-200,000; >200,000.

<sup>7</sup> Non-parametric test of the mean (ttest on Stata).



Also, life satisfaction can be influenced by current expectations as anticipatory emotions (see e.g. Lowenstein, 1987, Caplin and Leahy, 2001): current expectations are supposed to influence individuals' utility for the anticipatory feelings they produce, i.e. savoring if a person expects something good to happen in the future, or dread if something bad. The provision of the medical equipment to disabled patients is an exogenous shock that could possibly increase the expectations of those receiving the treatment. Patients have thus been asked their expectations about life overall in the next six months and specific domains of life through categorical variables taking five values, from strongly get worse to strongly improve. In the first wave of the project (June 2012) current expectations were significantly<sup>8</sup> higher for the treatment group than for the control one due to the treatment received. However, in June 2013 they have increased for the control group, which has just been treated, while decreased for the treatment group compared to the previous year (see Fig. 5).

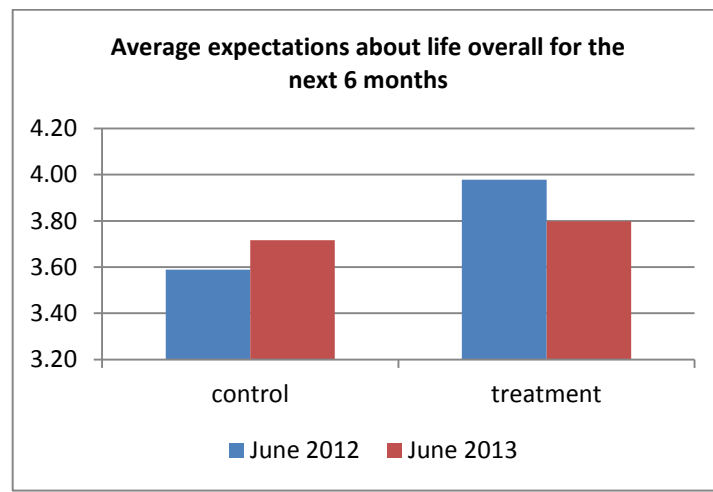


Figure 5 – Change in expectations about life overall for the next six months

As discussed above, expecting an improvement can have a positive impact on life satisfaction in the form of anticipatory emotions, while aspirations have a negative effect. The combination of the increase in income aspirations and decrease in expectations for the treatment group can help to explain why life satisfaction has almost returned to the original level one year after the intervention.

### 3.1 Empirical analysis

A first analysis of the treatment effect can be calculated through a simple diff-in-diff estimator:

$$DD = [E(Y_1|T) - E(Y_0|T)] - [E(Y_1|C) - E(Y_0|C)]$$

<sup>8</sup> Non-parametric test of the mean (ttest on Stata).

The main assumption to perform the diff-in-diff is that there are not significant differences between treatment and control group before the experiment, so that the change in the outcome variable can be explained only by the treatment and no other characteristics. This means that in absence of the treatment the difference in the outcome between treatment and control would be zero. The descriptive analysis of the two groups has shown that the treatment and control are similar in terms of socio-demographic characteristics. The resulting diff-in-diff estimators in the three waves following the treatment are shown in Table 1. Four months after the intervention (November 2012) the diff-in-diff estimator is 0,18, suggesting a positive effect of the treatment on life satisfaction. Ten months after the treatment, the diff-in-diff estimator is almost zero and the effect is disappearing. In one year, the control group has an average life satisfaction higher than the treatment one, and the diff-in-diff estimator has become negative.

**Table 1 – Diff-in-diff estimator of average life satisfaction**

Life satisfaction (mean)	Treatment	Control	Diff-in-Diff
June 2012	3,32	3,34	
Nov 2012	3,84	3,69	0,18
Apr 2013	3,72	3,72	0,03
June 2013	3,35	3,48	-0,11

The positive effect of the treatment seems thus only transitory. In order to test this empirically, we implement a fixed-effect model to control for individual fixed-effect:

$$LS_{it} = \alpha + \beta_1 treatment_i + \beta_2 wave_t + X_{it} + f_i + \varepsilon_i$$

Where  $treatment_i$  is a dummy for the treatment group,  $wave_t$  are time dummies,  $X_{it}$  socio-demographic variables and  $f_i$  are individual fixed-effects. Table 2 contains the estimates of the impact of the treatment on life satisfaction in the three waves following the intervention. Despite the large increase in life satisfaction experienced by those treated in June 2012 in the first months, the treatment effect is positive but not significant when fixed-effects are controlled for (column 1). As displayed by the diff-in-diff estimator, the effect of the treatment is almost zero after ten months from the intervention (column 2) and negative one year later (column 3), but never significant.

**Table 2 – Impact of the treatment on life satisfaction.**

	First follow-up (Nov. 2012)	Second follow-up (Apr. 2013)	Third follow-up (June 2013)
Treatment	0.153 (0.3245)	0.039 (0.2519)	-0.180 (0.2400)
November 2012	0.397 (0.2695)	0.445** (0.2199)	0.612*** (0.2161)
April 2013		0.327 (0.2190)	0.491** (0.2154)
June 2013			0.233 (0.2082)
_cons	3.336*** (0.0997)	3.357*** (0.0918)	3.355*** (0.0965)
<i>N</i>	478	701	957
<i>R</i> <sup>2</sup>	.05	.03	.02

Linear model with individual fixed-effects. Dependent variable: life satisfaction. Omitted category: June 2012. Standard errors in parenthesis.

As stated above, the negative effect of the treatment in one year could be due to the change in expectations and aspirations. Information about these have been asked only in June 2012 and June 2013 so that the estimates will refer to the impact evaluation in the overall year. Table 3 shows the results of the fixed-effects model controlling for expectations and income aspirations (column 1): the effect of the treatment is still not significant but it is now turning positive. As predicted by the literature, a positive change in expectations about life in the next six months has a positive effect on life satisfaction, despite not significant, while an increase in aspirations has a significant negative effect. Other individual characteristics which could be changed by the treatment are included in a second model (column 2), i.e. overall well-being as measured by the self-medical assessment (SF-8), individual earnings (log) and frequency of leisure time activities. The coefficient of the treatment dummy is again positive and even bigger in size, but still not significant. An increase in leisure time activities has a significant positive effect on life satisfaction.

**Table 3 – Impact evaluation controlling for expectations, aspirations and other individual characteristics.**

	Third follow-up (June 2013)	Third follow-up (June 2013)
Treatment	0.199 (0.4227)	0.624 (0.5843)
June 2013	0.006 (0.3498)	-0.452 (0.4733)
Expectations about life	0.016 (0.1942)	0.174 (0.2955)
Income aspirations	-0.358* (0.2014)	-0.314 (0.3014)
Well-being (SF-8)		-0.002 (0.0022)
Earnings (log)		-0.100 (0.1841)
Frequency of leisure time activities		0.687* (0.3828)
_cons	4.897*** (1.2062)	4.908 (3.4802)
<i>N</i>	384	276
<i>R</i> <sup>2</sup>	.02	.08

Linear model with individual fixed-effects. Dependent variable: life satisfaction. Omitted category: June 2012. Standard errors in parenthesis.

As a further analysis we interact the treatment and the gender dummies. Table 4 contains the estimates for the three waves, plus the results controlling for expectations, aspirations and other individual characteristics. Compared to the control group, the females treated in June 2012 experience a significant increase in life satisfaction in the four months after the intervention, while the opposite happens for the males treated. The positive effect for females ceases to be significant as time passes, while it remains negative and significant for males. Controlling for the change in expectations about life and income aspirations, the significant effect disappears but the sign remains positive for females and negative for males.

**Table 4 – Impact evaluation by gender**

	First follow-up (Nov. 2012)	Second follow-up (Apr. 2013)	Third follow-up (June 2013)	Third follow-up (June 2013)	Third follow-up (June 2013)
Treatment	0.651* (0.3863)	0.436 (0.3027)	0.119 (0.2889)	0.011 (0.4564)	0.389 (0.6526)
Treatment_male	-0.846** (0.3639)	-0.670** (0.2870)	-0.507* (0.2737)	-0.212 (0.4330)	-0.342 (0.6475)
November 2012	0.397 (0.2668)	0.445** (0.2188)	0.611*** (0.2157)		
April 2013		0.327 (0.2179)	0.490** (0.2150)		
June 2013			0.235 (0.2078)	0.244 (0.3023)	-0.120 (0.4076)
Expectations about life				0.055 (0.1779)	0.172 (0.2786)
Income aspirations				-0.287 (0.1813)	-0.263 (0.2747)
Well-being (SF-8)					-0.002 (0.0020)
Earnings (log)					0.017 (0.1701)
Leisure time					0.658* (0.3601)
_cons	3.335*** (0.0987)	3.356*** (0.0914)	3.355*** (0.0963)	4.469*** (1.1153)	3.355 (3.0899)
<i>N</i>	478	701	957	467	335
<i>R</i> <sup>2</sup>	.07	.04	.03	.02	.06

Linear model with individual fixed-effects. Dependent variable: life satisfaction. Omitted category: June 2012. Standard errors in parenthesis.

Further analyses need to include the change in the medical conditions that comes from the medical assessment, in particular those related to the patients' mobility and physical impairment. The data will be soon available and they will help to explain the impact of the treatment and the effect on subjective well-being.

## 4 Conclusions

We empirically investigate the effect of a treatment, i.e. the provision of medical equipment to people with lower limbs disabilities, on subjective well-being. The treatment is supposed to improve the patients' overall well-being, increasing their mobility, independence and ability to perform day-to-day activities. This should have an impact on their life satisfaction, *ceteris paribus*, at least in the short run. However, adaptation theories claim that people adapt to their new conditions in the medium-long run, so

that the change in life satisfaction is only transitory, due to also the change in aspirations and expectations. The pattern of life satisfaction seems to show that indeed the patients treated have adapted to the treatment in less than year: a large increase in life satisfaction has been found for the treatment four months after the intervention, despite significant only for women when controlling for individual fixed-effects. Ten months after the intervention, the effect has already almost disappeared. The phenomenon of adaptation can be explained by the change in aspirations and expectations: the data has shown that the patients treated in June 2012 had higher expectations about life than the control group because of the treatment received, and that one year later their income aspirations have increased compared to the control group. The self-medical assessment (SF-8) shows a quite similar pattern: those treated report an improvement in the first months after the intervention, but the effect disappears in the following months, and one year later is equal to the control group, and even lower than the original level. This can be due to strategic answering in order to receive further treatment in June 2013. Objective data of the medical assessment will help to understand better the impact of the treatment on the patients' objective and subjective well-being.

## References

- Barr, A., Clark, D., (2009). Do the poor adapt to low income, minimal education and ill-health?. *Journal of African Economies*, 19, 257-293.
- Brickman, P., Campbell, D.T., (1971). Hedonic Relativism and Planning the Good Society. In *Adaptation Level Theory: A Symposium*, ed. H. Appley. New York: Academic Press, 287-302.
- Brickman, P., Coates, D., Janoff-Bulman, J., (1978). Lottery Winners and Accident Victims: Is Happiness Relative? *Journal of Personality and Social Psychology*, 36, 917-927.
- Di Tella, R., Haisken-De New, J., MacCulloch, R., (2010). Happiness adaptation to income and to status in an individual panel. *Journal of Economic Behaviour & Organization*, 76, 834-852.
- Diener, E., Lucas, R.E., Scollon, C. (2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. *American Psychologist*, 61, 305–314.
- Dijkers, M. (1997). Quality of life after spinal cord injury: A meta analysis of the effects of disablement components. *Spinal Cord*, 35, 829–840.
- Easterlin, R., (1974). Does economic growth improve the human lot? In: David, P., Reder, M. (Eds.), *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz*. Academic Press, New York, pp. 89–125.
- Fafchamps, M., Kebede, B., (2008). Subjective well-being, disability and adaptation: A case study from rural Ethiopia. In *Adaptation and Well-being*, ed. David Clark. London: Cambridge University Press.
- Frederick, S., Loewenstein, G., (1999). Hedonic adaptation. In: Kahneman, D., Diener, E., Schwarz, N. (Eds.), *Well-being: The Foundations of Hedonic Psychology*. Russell Sage Foundation, New York, pp. 302–329.
- Fujita, F., Diener, E. (2005). Life satisfaction set point: Stability and change. *Journal of Personality and Social Psychology*, 88, 158–164.
- Gilboa, I., Schmeidler, D. (2001). A cognitive model of individual well-being. *Soc Choice Welfare*, 18, 269-288.
- Helson, H., (1964). *Adaptation-level theory: an experimental and systematic approach to behaviour*. New York: Hamper and Row.
- Kahneman, D., Varey, C., (1991). Notes on the Psychology of Utility. In J. Elster and J. E. Roemer, eds., *Interpersonal Comparisons of Well-Being: Studies in Rationality and Social Change* (New York: Cambridge, 1991), pp. 127-63.
- Knight, J., Gunatilaka, R., (2012). Income, aspirations and Hedonic Treadmill in a poor society. *Journal of Economic Behavior and Organization*, 82, 67-81.
- Lucas, R.E. (2005). Time does not heal all wounds: A longitudinal study of reaction and adaptation to divorce. *Psychological Science*, 16, 945–950.
- Lucas, R.E., Clark, A.E., Georgellis, Y., Diener, E. (2003). Reexamining adaptation and the set point model of happiness: Reactions to changes in marital status. *Journal of Personality & Social Psychology*, 84, 527–539.
- Lucas, R.E., Clark, A.E., Georgellis, Y., Diener, E. (2004). Unemployment alters the set point for life satisfaction. *Psychological Science*, 15, 8–13.

- Lykken, D., Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science*, 7, 186-9.
- Oswald, A., Powdthavee, N., (2008). Does happiness adapt? A longitudinal study of disability with implications for economists and judges. *Journal of Public Economics*, 92, 1061–1077.
- Parducci, A., (1968). The relativism of absolute judgments. *Scientific American*, 219, 84-90.
- Strahilevitz, M., Lowenstein, G., (1998). The effect of ownership history on the valuation of objects. *Journal of Consumer Research*, 25,276-89.
- Stutzer, A., (2004). The role of income aspirations in individual happiness. *Journal of Economic Behavior and Organization*, 54, 89–109.
- Tellegen, A., Lykken, D. T., Bouchard, T. J., Jr. Wilcox, K., Segal, N., and Rich., S., (1988). Personality similarity in twins reared apart and together. *Journal of Personality and Social Psychology*, 54, 1031-1039.
- Tyc, V.L. (1992). Psychosocial adaptation of children and adolescents with limb deficiencies: A review. *Clinical Psychology Review*, 2, 275–291.
- Ubel, P. A., Lowenstein, G., Schwarz, N., Smith, D., (2005). Misimagining the Unimaginable: The Disability Paradox and Health Care Decision Making. *Health Psychology*, 24, S57-S62.
- van Praag, B. M. S., van der Sar, N. L., (1988). Empirical uses of subjective measures of well-being. *Human resources*, 23, 193-210.
- van Praag, B., (1977). The welfare function of income in Belgium: An empirical investigation. *European Economic Review*, 337-69.



## 5 Appendix

Appendix A – Frequencies of main socio-demographic variables in June 2012

	Total sample			Treatment			Control		
	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.
<b>Gender</b>									
female	146	41.95	41.95	95	40.77	40.77	51	44.35	44.35
male	202	58.05	100	138	59.23	100	64	55.65	100
Total	348	100		233	100		115	100	
<b>Age range</b>									
20 <	5	1.44	1.44	3	1.29	1.29	2	1.74	1.74
20-30	72	20.69	22.13	53	22.75	24.03	19	16.52	18.26
30-40	100	28.74	50.86	68	29.18	53.22	32	27.83	46.09
40-55	115	33.05	83.91	75	32.19	85.41	40	34.78	80.87
55 >	56	16.09	100	34	14.59	100	22	19.13	100
Total	348	100		233	100		115	100	
<b>Marital status</b>									
married	134	38.51	38.51	94	40.34	40.34	40	34.78	34.78
married polygamously	21	6.03	44.54	14	6.01	46.35	7	6.09	40.87
divorced/separated	50	14.37	58.91	30	12.88	59.23	20	17.39	58.26
widowed	30	8.62	67.53	25	10.73	69.96	5	4.35	62.61
never married	89	25.57	93.1	54	23.18	93.13	35	30.43	93.04
cohabitating	24	6.9	100	16	6.87	100	8	6.96	100
Total	348	100		233	100		115	100	
<b>Job_status</b>									
wage employed	97	27.95	27.95	69	29,74	29,74	28	24,35	24,35
self-employed	167	48.13	76.08	99	42,67	72,41	68	59,13	83,48
unemployed	28	8.07	84.15	21	9,05	81,47	7	6,09	89,57
unpaid family worker	5	1.44	85.59	4	1,72	83,19	1	0,87	90,43
student	13	3.75	89.34	9	3,88	87,07	4	3,48	93,91
sick/unable to work	34	9.80	99.14	28	12,07	99,14	6	5,22	99,13
retired	2	0.58	99.71	2	0,86	100	-	-	-
volunteer	1	0.29	100.00	-	-	-	1	0,87	100
Total	348	100		232	100		115	100	
<b>Religion</b>									
catholic	111	31.9	31.9	73	31.33	31.33	38	33.04	33.04
protestant	98	28.16	60.06	67	28.76	60.09	31	26.96	60
muslim	77	22.13	82.18	52	22.32	82.4	25	21.74	81.74
pentecostal	43	12.36	94.54	27	11.59	93.99	16	13.91	95.65
7th day adventist	12	3.45	97.99	9	3.86	97.85	3	2.61	98.26
traditionalist	2	0.57	98.56	2	0.86	98.71	-	-	
none	1	0.29	98.85	1	0.43	99.14	-	-	
other	1	0.29	99.14	-	-		1	0.87	99.13
orthodox	2	0.57	99.71	2	0.86	100	-	-	
.	1	0.29	100	-	-		1	0.87	100
Total	348	100		233	100		115	100	

	Treatment		Control		T-test (p-value)
	mean	std.dev.	mean	std.dev.	
Life satisfaction	3,30	1,90	3,50	1,91	0,34
Earnings (UGX)	343785	813140	240626	465057	0,27
Income aspirations	4,58	0,83	4,65	0,85	0,47
Gender	0,59	0,49	0,56	0,50	0,53
Age	39,90	12,45	41,33	13,34	0,33
Marital status	2,57	1,68	2,76	1,72	0,35
Job status	1,98	0,76	1,92	0,64	0,13
Years of schooling	9,00	3,95	9,20	3,92	0,76
SF-8	526,64	125,44	532,34	112,58	0,69
Frequency of leisure time activities	2,40	0,60	2,36	0,57	0,50

## Appendix B – Physical and emotional well-being (SF-8)

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### SF-8

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- 1 - Overall, how would you rate your health during the past 4 weeks?
  - 2 - During the past 4 weeks, how much did physical health problems limit your usual physical activities (such as walking or climbing stairs)?
  - 3 - During the past 4 weeks, how much difficulty did you have doing your daily work, both at home and away from home, because of your physical health?
  - 4 - How much bodily pain have you had during the past 4 weeks?
  - 5 - During the past 4 weeks, how much energy did you have?
  - 6 - During the past 4 weeks, how much did your physical health or emotional problems limit your usual social activities with family or friends?
  - 7 - During the past 4 weeks, how much have you bothered by emotional problems (such as feeling anxious, depressed or irritable)?
  - 8 - During the past 4 weeks, how much did personal or emotional problems keep you from doing your usual work, school or other daily activities?
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