

VOLUNTARY ACTIVITIES AND DAILY HAPPINESS IN THE UNITED STATES

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This article analyzes differences in daily happiness between those individuals in the United States who perform voluntary activities during the day and those who do not. Using the Well-Being Module of the American Time Use Survey 2010, we find that those who devote any time to voluntary activities during the day report higher levels of daily happiness than those who do not. Comparing the happiness obtained from a range of activities, we find that volunteering is among the most enjoyable, indicating that time spent on voluntary activities is utility-enhancing. We document that the effect of voluntary activities on the experienced utility of individuals can be decomposed into a “time-composition” effect and an “activity” effect, with the latter explaining between 11% and 46% of the observed difference. (JEL D13, J16, J22)

I. INTRODUCTION

We analyze here the relationship between voluntary activities and the happiness obtained throughout the day by individuals in the United States, which has a long tradition of community service and continues to lead other Western countries in volunteering. American adults are more than twice as likely as German and French adults to contribute time and energy to community work (Ladd 1999; Putnam 2000), and participation in voluntary activities has increased in recent years (U.S. Bureau of Labor Statistics 2013a). Voluntary activity is a significant economic activity in the United States. Americans aged 15 years and older spent 2.5 hours, on average, doing formal and informal volunteering on days that they

volunteered, with between 6% and 8% of the U.S. population volunteering on any given day, over the period 2007–2011 (U.S. Bureau of Labor Statistics 2013b). Volunteering plays a prominent role in the charitable provision of goods and services, and it is often regarded as being fundamental to the sustainability of any society. Hence, the factors and/or motives behind individual philanthropic behavior are worth analyzing, as a deeper understanding of charitable donations of time could help economists and policy-makers anticipate behavioral responses to changes in economic fundamentals.

Among the different hypotheses as to why individuals devote time to voluntary activities, one basic idea is that it increases the utility of individuals (Andreoni 1989, 1990; Becker 1974). The literature on the determinants of happiness (or Subjective Well-Being, SWB) has studied the factors that make individuals happier, with some studies showing that volunteering is positively related to individual SWB (Binder and Freytag 2013; Dolan, Peasgood, and White 2008; Meier

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ABBREVIATIONS

ATUS: American Time Use Survey
 BHPS: British Household Panel Survey
 ECHP: European Community Household Panel
 GSOEP: German Socio-Economic Panel
 OLS: Ordinary Least Squares
 RE: Random-Effects
 SWB: Subjective Well-Being

and Stutzer 2008).¹ In this article, we take an alternative approach, and we examine the happiness obtained by individuals during their daily activities.² Within this framework, we compare the daily happiness obtained by individuals who do, or do not, devote time to voluntary activities. To that end, we use the sample of individuals from the *Well-Being Module* of the 2010 American Time Use Survey (ATUS), which provides information on individual time use, based on diary questionnaires, in which individuals report their activities throughout the 24 hours of the day, as well as information on the feelings individuals experience during their time-use activities.

We use two measures of daily happiness that have been proposed in the literature and regress them on an indicator of whether the diarist reported some time spent on voluntary activities during the day of the interview. We find that those who devote any time to voluntary activities during the day report obtaining a higher level of happiness than those who do not devote such time. These results are maintained when we control for the scaling effect of individuals and when we exclude episodes of voluntary activities from the analysis, and the variations are not driven by participation in religious activities.

We also follow Knabe et al. (2010) and decompose the difference in the daily happiness between volunteers and non-volunteers into two components: a “time-composition” effect and an “activity” effect. The former captures the difference in daily happiness that can be attributed to differences in the distribution of activities during the day. To the extent that different activities provide different levels of individual-experienced utility, the difference in the experienced utility between volunteers and non-volunteers could be explained because those who devote time to volunteer activities may differ in how they spend their time, compared to those who do not volunteer. Such differences in the distribution of activity time include voluntary activities that are shown to be ranked among the five most enjoyable activities, consistent with prior studies. For instance, Krueger (2007) analyzes data on experienced utility in the United States and classifies the

“general voluntary acts” in the group of “the most enjoyable and interesting activities.” Kahneman et al. (2004), Krueger et al. (2009), and White and Dolan (2009) also show that voluntary activities are positively related to happiness.

The latter effect captures the variations in daily happiness obtained while engaged in similar activities. That is to say, volunteers and non-volunteers report different levels of daily happiness when engaged in the same activities during the day, which could explain part of the observed differences in daily happiness between the two groups. The effect explains between 11% and 46% of the differences in happiness between volunteers and non-volunteers during the day. There are two possible sources of this effect. First, it could be that voluntary activities affect the happiness volunteers obtain during their non-voluntary activities, leading to a “cheering” effect. In this sense, increased happiness is passed on from voluntary activities to non-voluntary activities. Second, it could be that volunteers report higher levels of happiness in voluntary and non-voluntary activities because of other, unmeasured factors (e.g., personality, mood during the survey day) that make volunteers happier in general. This is what we call the “personality” effect. In this second explanation, the differences are defined at the individual level, as they depend on interpersonal differences in the same activities. Unfortunately, the data at hand do not allow us to disentangle which is the correct explanation.

We contribute to the literature by examining the relationship between voluntary activities and the happiness of individuals (Binder and Freytag 2013; Boronovi 2008; Brooks 2006; Dolan, Peasgood, and White 2008; Greenfield and Marks 2004; Meier and Stutzer 2008; Thoits and Hewitt 2001), by offering a novel analysis of how voluntary activities affect the daily happiness individuals obtain during the day. We find that those who volunteer report higher levels of daily happiness. This work complements prior analyses on how voluntary labor relates to subjective well-being, but, while other studies have used retrospective questions on happiness or well-being, aimed at measuring happiness in the long run, our approach focuses on the short run. Thus, whereas traditional SWB measures refer to “life as you remember it,” we concentrate here on “life as you live it.” Our second contribution lies in the decomposition of the difference in daily happiness between the two groups into two components with, to the best of our knowledge,

1. See Dolan, Peasgood, and White (2008) and Binder and Freytag (2013) for a review of the factors correlated with volunteering and SWB.

2. This concept refers to the “experienced utility,” as used by Kahneman et al. (1997), who define it as a “continuous hedonic flow of pleasure or pain.”

only Knabe et al. (2010) having done anything similar. This decomposition will serve as a first step in understanding differences in daily happiness between volunteers and non-volunteers.

The rest of the article is organized as follows. Section II presents a review of the most relevant literature for the current study. Section III describes the data and variables. Section IV analyzes initially the relationship between voluntary activities and happiness. Section V shows the decomposition of the difference in daily happiness between the “time-composition” and “activity” effects. Section VI sets out our main conclusions.

II. LITERATURE REVIEW

Volunteering can be broadly defined as “any activity in which time is given freely to benefit another person, group or organization” (Wilson 2000, 215). In Economics, explanations of the philanthropic behavior of individuals vary. One of these is the straightforward utility-maximization model, where donors obtain tangible benefits, in line with the basic notion of a rational “homo-economicus.” If we relax the utility-maximization assumption, giving may take place when individuals are interested in the well-being of others, leading to the “pure altruism model” (e.g., Becker 1974; Duncan 1999; Unger 1991), or it may take place when donors derive benefit from the act of giving, leading to the “impure altruism” or “warm glow” model (Andreoni 1989, 1990; Rose-Ackerman 1996). The “investment model” considers that volunteering may enable individuals to accumulate human capital, expand networks, signal productive characteristics to firms, or acquire contacts that can help in the future (e.g., Freeman 1997; Menchik and Weisbrod 1987; Wilson 2012). Hence, the consumption motive is associated with the first three explanations, as there are direct increases of the contemporaneous utility of individuals from volunteering, and the investment motive considers an indirect increase in future utility. Menchik and Weisbrod (1987) analyze each of these motives and conclude that both play an important role in the decision to volunteer, although Freeman (1997) fails to confirm the importance of the consumption motive.

Several positive outcomes have been proposed as being associated with volunteering, including increased health (Post 2005) and well-being (see Dolan, Peasgood, and White 2008, for a

review). Volunteering has also been seen as positively related to the subjective well-being of volunteers (Becchetti, Pelloni, and Rossetti 2008; Borgonovi 2008; Brooks 2006; Dolan, Peasgood, and White 2008; Helliwell 2003; Helliwell and Putnam 2004; Pichler 2006; Post 2005). Some of these studies have taken into account issues of reverse causality (people volunteer more when they are happy) and simultaneity biases (some third factor, such as religion, leads to more volunteering and to more happiness). Meier and Stutzer (2008) find that the impact of volunteering is considerably reduced when fixed effects are controlled for, and only volunteering weekly remains significant, suggesting that the higher levels of well-being arise from individual heterogeneity. Binder and Freytag (2013) apply matching estimators and find that the impact of regular volunteering on SWB is positive and increases over time when regular volunteering is sustained. Others have found that volunteering is negatively related to subjective well-being (Bjørnskov 2006; Li, Pickles, and Savage 2005).

Demographic characteristics have been found to be among the factors affecting volunteering. Prior literature has found that education is a significant factor in the decision to volunteer (Huang, van den Brink, and Groot 2009; Wilson 2012). Other variables are being male (Wilson and Musick 1997), being White (Rotolo, Wilson, and Hughes 2010), and being middle-aged (Wilson 2012). Income, apparently, has no effect on the volunteer behavior of individuals (Brooks 2007), while the unemployed are less likely to volunteer (Wilson 2000).

Other factors that affect volunteering, and are more difficult to isolate, are personality traits and the social context.³ Regarding personality traits, among the “Big Five” personality dimensions—extraversion, agreeableness, conscientiousness, neuroticism, and openness (Gosling, Rentfrow, and Swann 2003)—some studies have found a positive relationship between extraversion and agreeableness and the likelihood of volunteering (Bekkers 2010; Omoto, Snyder, and Hackett 2010). These findings indicate the importance of the unobserved heterogeneity of individuals in determining volunteer behavior. Alternatively, prestige and reputation have been proposed as influential factors (Ariely, Bracha, and Meier 2009; Bekkers

3. See Binder and Freytag (2013) for a review of the literature on the relationship between volunteering, personality traits, and social context.

2010; Bénabou and Tirole 2005; Carpenter and Myers 2010; Glazer and Konrad 1996; Meier and Stutzer 2008; Ostrower 1997; Shang and Croson 2009). The social context has been shown to be an important factor in voluntary behavior, as larger social networks seem to increase the propensity to volunteer (Okun, Pugliese, and Rook 2007), while trust in other people also can be positively related to volunteering (Brehm and Rahn 1997; Putnam 2000). Additionally, religion seems to be positively related to volunteering, at least in the United States (Borgonovi 2008; Brooks 2006).

Finally, and regarding the factors associated with the experienced utility of individuals, Kahneman et al. (2004), using data on experienced utility for a sample of 909 working women in the United States, found that activities done in the presence of friends, relatives, and the spouse and children are superior in terms of utility, compared to acting alone, which shows the importance of taking into account the presence of others while individuals are doing their daily activities. Sevilla, Gimenez-Nadal, and Gershuny (2012) find that, for both the United Kingdom and the United States, the presence of young children is associated with greater happiness. Furthermore, Krueger (2007) classifies “general voluntary acts” in the group of “the most enjoyable and interesting activities,” finding that characteristics such as age, being male, and having a higher educational level are all factors related to lower experienced utility. Thus, it is important to control for the socio-demographic characteristics of the individuals in our regressions, in order to net out the effects of volunteering from the effects of such factors, as different individuals may have different volunteering behavior. Also, the presence of others during the activity of reference must also be taken into account, to net out the effect of volunteering from the effect of other factors.

III. DATA, SAMPLE, AND VARIABLES

We use the *Well-Being Module* from the 2010 ATUS to establish a link between daily happiness and voluntary activities. The module for time-use information was added to the ATUS diary to capture how individuals felt during selected activities, and was fielded from January through December, 2010. Respondents were first asked to fill out a diary summarizing episodes of the preceding day. The advantage of time-use surveys over stylized questions, such as those included in the European Community Household Panel

(ECHP), the British Household Panel Survey (BHPS), and the German Socio-Economic Panel (GSOEP), where respondents are asked how much time they have spent, for example, in the previous week, or normally spend each week, on market work or housework, is that diary-based estimates of time use are more reliable and accurate than estimates derived from direct questions (Bianchi et al. 2000; Bonke 2005; Juster and Stafford 1985; Robinson and Godbey 1985; Yee-Kan 2008).

There are several methodologies to assess the link between activities and feelings. The *process benefits* approach uses *Activity Enjoyment Ratings*, where respondents are asked to rate on a scale from 0 to 10 how much they enjoyed a certain type of activity (Juster and Stafford 1985). The *experienced utility* approach proposes the *Experience Sampling Method* as a superior way to collect objective instantaneous enjoyment data, and where information on hedonic experiences (or instant enjoyment) in real time is collected. Alternative methods of collecting data on hedonic experience, such as the conventional *yesterday diary* used in time-budget surveys (Szalai 1972) or the *Day Reconstruction Method* (Kahneman et al. 2004), are less costly to implement. Both methods collect information on how the respondent experienced all or some of the activities he or she engaged in during the previous day, as described in a time-use diary. Specifically, the *Well-Being Module* of the ATUS (2010) uses the *Day Reconstruction Method*, where three episodes from the preceding day, lasting at least 5 minutes, are randomly selected and diarists are asked to rank on a 7-point scale the extent to which they were happy, stressed, sad, tired, or felt pain during the activity, with “0” indicating “did not experience the feeling at all” and “6” indicating “feeling was extremely strong.” The type of well-being that can be measured with the *ATUS Well-Being Module* refers to the subjective happiness experienced by individuals throughout the day.

A. Sample and Variables

For the sake of comparison with prior studies (Aguiar and Hurst 2007; Gimenez-Nadal and Sevilla 2012), and to minimize the role of time-allocation decisions, such as education and retirement, that have a strong inter-temporal component over the life cycle, we restrict the sample used throughout our analysis to non-retired/non-student individuals between the ages

of 21 and 65 years (inclusive).⁴ From the original sample of 37,935, the selection of individuals for our study gives us 26,099 observations, obtaining a final sample 25,601 episodes, from 8,746 individuals, when we eliminate observations with missing socio-demographic information.

We use two dependent variables throughout the article. The first refers to the net-affect, defined as the difference between the average score the respondent gives to all positive attributes and the average score of all negative attributes. In our case, for one episode, it can be defined as the average score the respondent gives to all positive attributes (happiness) minus the average score of all negative attributes (stress, tiredness, sadness, or pain). We define A_{ij} as the individual “ i ” net-affect during activity “ j ,” as follows:

$$A_{ij} = \left[\left(\sum_{l=1}^L PA_{ij}^l \right) / L \right] - \left[\left(\sum_{k=1}^K NA_{ij}^k \right) / K \right]$$

where PA_{ij}^l represents the affect score of the l -th (out of L) positive emotion individual “ i ” reports for activity “ j ,” and NA_{ij}^k represents the affect score of the k -th (out of K) negative emotion. The *net-affect* is a cardinal measure, based on the assumption that utility is time-separable, which leads the *net-affect* to be a meaningful representation of the utility derived from a given experience (Kahneman et al. 2004). This measure can take any value from -6 to 6 . However, one disadvantage of the *net-affect* is that it is unclear what the scale of measurement really refers to, and whether different individuals interpret the scale in the same way.

The second dependent variable refers to the u-index, also known as the misery index, that measures the proportion of time that is spent in an unpleasant state and, for a given episode, is

defined as equal to 1 if the maximum rating of any of the negative emotions (stress, tiredness, sadness, pain) strictly exceeds the rating of happiness, and 0 if not. For instance, if for a given episode, we have a value of 3 for happiness, and we have a higher value (4, 5, or 6) for any of the other feelings (stress, tiredness, sadness, pain), the u-index takes value “1.” But if, for a given episode, we have a value of 4 for happiness, and we have lower or equal values (1, 2, 3, and 4) for the other feelings, the u-index takes value “0.” We define U_{ij} as the individual “ i ” u-index during activity “ j ,” as follows:

$$U_{ij} = \begin{cases} 1 & \text{if } \max \left(NA_{ij}^1, \dots, NA_{ij}^k, \dots, NA_{ij}^K \right) \\ & > \max \left(PA_{ij}^1, \dots, PA_{ij}^l, \dots, PA_{ij}^L \right) \\ 0 & \text{otherwise} \end{cases}$$

where PA_{ij}^l represents the affect score of the l -th (out of L) positive emotion individual “ i ” reports for activity “ j ,” and NA_{ij}^k represents the affect score of the k -th (out of K) negative emotion. This measure may take values of “0” and “1.” The main advantage of the u-index over the net-affect is that the u-index is independent of scale effects and avoids the problem of individual interpretation. One disadvantage of the u-index is that the assessment of feelings is truly ordinal, and it depends on what emotions are included in the questionnaire.

Table 1 shows the means and standard deviations of the net-affect and the u-index for individuals in our sample. The overall values for the net-affect and the u-index are 2.768 and 0.261, respectively.⁵ Considering the u-index, which yields a more direct interpretation, we observe that during 26% of their time, individuals in the United States are in an unpleasant state (i.e., any of the negative feelings overcomes the positive

4. We have alternatively analyzed individuals aged between 15 and 85 years. Results are qualitatively the same, with the only difference being that the variations in daily happiness reported by those who did any voluntary activity during the day, compared to those who did not, are larger compared to our main results. Also, when we restrict the analysis to retired people over age 64 years, we find that the difference in experienced utility reported by those who did any voluntary activity during the day, compared to those who did not, is larger compared to our main results (results are available upon request). This can be explained by the fact that prior research has found that elderly individuals profit strongly from volunteering work in terms of well-being (Choi and Kim 2011; Dulin et al. 2012; Greenfield and Marks 2004), which may be explained by the fact that elderly people who volunteer are less isolated (Musick and Wilson 2003; Onyx and Warburton 2003).

5. The overall values are calculated using the duration weights of the episodes included in the Well-Being Module of the ATUS. There was an error in the activity selection process, and because of a programming error in the data collection software, certain activities were less likely than others to be selected for follow-up questions in the module. The last eligible activity in each respondent’s time diary was incorrectly excluded from the random selection process in most cases. As a result, eligible activities that occur at or near the end of the diary are underrepresented in the data. For example, the last eligible diary activity often is a long spell of TV watching; because of the selection error, TV watching is underrepresented in the WB Module data and the average duration of activities selected for the module is shorter than the average duration of all eligible diary activities. Consequently, well-being activity weights are adjusted to compensate for those activities that were underrepresented.

TABLE 1
Summary Statistics for Experienced Utility

	(1)		(2)		(3)		(4)	(5)
	All the Episodes		Episodes with Volunteering		Episodes without Volunteering			
	Mean	SD	Mean	SD	Mean	SD	Diff	<i>p</i> Value Diff
Net-Affect	2.768	(2.384)	3.113	(2.364)	2.728	(2.383)	0.385	(<0.01)
u-Index	0.261	(0.439)	0.219	(0.413)	0.266	(0.442)	-0.047	(<0.01)
N observations	25,604		3,235		22,369			

Notes: Sample consists of episodes from non-retired/non-students respondents aged 21–65 years from the ATUS 2010 Well-being Module. Standard deviations are in parentheses. Means are computed using the original weights included in the survey. Column (1) shows means and standard deviations for the net-affect and u-index for all episodes. Column (2) shows mean and standard deviations for the net-affect and the u-index for episodes of respondents reporting positive time in volunteer activities throughout the diary day. Column (3) shows mean and standard deviations for the net-affect and the u-index for episodes of respondents reporting no time in volunteer activities throughout the diary day. Column (4) shows the differences in mean values of the net-affect and the u-index for episodes from individuals devoting and not devoting time to volunteer activities throughout the day, and Column (5) shows the *p* value of the difference based on a *t*-test type test.

feeling). A comparison of the mean value of the u-index and prior research indicates that the mean value for our sample differs (e.g., Krueger 2007; Krueger et al. 2009), as the u-index presents a higher value. In particular, the mean value for the u-index in Krueger (2007) and Krueger et al. (2009) is around 0.19. The reason for such difference can be explained by sample selection issues. In our sample, we select individuals aged between 21 and 65 years who are not students and not retired, and thus the proportion of individuals who work is likely to be higher, compared to other analyses based on more general samples. To the extent that individuals who are employed devote time to market work and commuting, activities that have been shown to be very unpleasant, this difference can explain why, in our case, individuals obtain lower daily happiness.

If we carry out the analysis considering whether the diary includes any type of voluntary activity, we observe that there are statistically significant differences between the two groups (i.e., diaries with, and without, voluntary activities).⁶ In the case of the net-affect, we observe that the overall values for diaries with and

without voluntary activities are 3.113 and 2.728, respectively, which yields a gap of 0.385 in the net-affect in favor of diaries with voluntary activities. In the case of the u-index, we observe that the overall values for diaries with and without voluntary activities are 0.219 and 0.266, respectively, which yields a gap of -0.047 in the u-index in favor of diaries with voluntary activities. These differences are statistically significant at standard levels ($p < 0.01$). From this analysis, we can conclude that there is a raw difference in daily happiness favoring individuals with voluntary activities in their diaries. Our analysis is based on 3,235 episodes, coming from 1,099 individuals who were involved in any voluntary activity during the day, and on 22,369 episodes coming from 7,647 individuals who were not involved in any voluntary activity during the day.

In order to better understand the greater daily happiness of volunteers vis-à-vis non-volunteers, we explore how pleasant single activities are perceived. Table 2 shows a list of 26 activities ranked by the average value of the net-affect (see Table S1 in Supporting Information for categorization of these activities). The activities at the top are the most enjoyable, while those at the bottom can be considered the least enjoyable. Together

6. We consider voluntary activities to include the following ATUS categories: "Computer use (volunteer)," "Organizing and preparing (volunteer)," "Reading (volunteer)," "Telephone calls (volunteer, except hotline counseling)," "Writing (volunteer)," "Fundraising (volunteer)," "Administrative and support activities (volunteer)," "Food preparation, presentation, and clean-up (volunteer)," "Collecting and delivering clothing and other goods (volunteer)," "Providing care (volunteer)," "Teaching, leading, counseling, mentoring (volunteer)," "Social service and care activities (volunteer)," "Building houses, wildlife sites, and other structures (volunteer)," "Indoor and outdoor maintenance, repair, and clean-up (volunteer)," "Performing

(volunteer)," "Serving at volunteer events and cultural activities (volunteer)," "Participating in performance and cultural activities (volunteer)," "Attending meetings, conferences, and training (volunteer)," "Public health activities (volunteer)," "Public safety activities (volunteer)," "Public health and safety activities (volunteer)," "Waiting associated with volunteer activities," "Security procedures related to volunteer activities," "Civic obligations and participation," and "Waiting associated with civic obligations and participation."

TABLE 2
Overall Experienced Utility, by Activity Type

Activities	(1) Net-Affect	(2) u-Index	(3) Time in Activity (minutes per day)	(4) Participation in Activity ($T > 0$)
Supervisory child care	4.548	0.064	10.760	12.566%
Out-of-home leisure	4.195	0.087	7.461	9.845%
Religious activities	4.007	0.127	22.814	23.394%
Teaching child care	3.637	0.162	0.015	1.532%
Voluntary activities	3.483	0.194	5.887	13.195%
Sports/exercise	3.415	0.159	14.549	16.670%
Basic child care	3.400	0.195	23.257	32.038%
Eating	3.346	0.177	52.852	90.521%
At-home leisure	3.274	0.205	61.862	50.938%
Reading/listening	3.130	0.202	15.768	20.901%
Gardening/pet care	3.101	0.223	18.314	21.587%
Leisure travel	3.017	0.198	14.667	37.594%
Personal care	2.986	0.194	14.195	33.410%
Cooking meals	2.977	0.221	35.538	60.519%
Adult care	2.925	0.290	11.734	15.721%
Writing/paperwork	2.802	0.270	18.422	27.944%
TV watching	2.693	0.264	143.950	78.745%
Shopping	2.650	0.286	28.298	47.267%
Commuting/work-related	2.645	0.266	22.359	37.103%
Other housework	2.619	0.270	28.258	54.665%
Education	2.372	0.275	2.091	1.063%
Housework	2.352	0.291	43.191	38.886%
Main work	2.271	0.328	263.924	46.890%
Home/car maintenance	2.095	0.308	5.607	6.048%
Job search	1.539	0.500	4.986	1.864%
Own medical care	-0.070	0.740	4.551	4.825%
N Observations	25,601	25,601	8,746	8,746

Notes: Sample consists of non-retired/non-students respondents aged 21–65 years from the ATUS 2010 Well-Being Module. Activities are ranked from the highest to the lowest net-affect. Classification of activities is shown in Table S1 in Supporting Information. Overall values are computed using the original weights of the survey, which take into account the duration and are adjusted to compensate for the activities that were underrepresented in the WB module because of the exclusion error in the selection process.

with nonbasic child care, religious activities, and out-of-home leisure, voluntary activities are in the group of activities that are most enjoyable, with average net-affect and u-index of 3.483 and 0.194, respectively, this being consistent with prior results (Kahneman et al. 2004; Krueger 2007, 2009; Robinson 2014; White and Dolan 2009). Thus, part of the variation in daily happiness between volunteers and non-volunteers can be explained because voluntary activities are among the most enjoyable, which increases the daily happiness of individuals. We address in Section V the extent to which this difference in voluntary time can explain the difference in daily happiness.

However, the differences in daily happiness are raw differences, not taking into account that socio-demographic differences may partially or totally drive the difference in daily happiness between volunteers and non-volunteers. In order to net out the effect of voluntary activities from

the effect of other socio-demographic characteristics, we use several explanatory variables aimed at capturing differences in household and personal characteristics across respondents. We include gender (male), age and its square, dummy variables for university and secondary education, dummies for working full and part time, a dummy to control for the presence of children aged under 18 years in the household, a dummy to indicate whether the respondent is married/cohabiting, household income, and dummy variables for region of residence (ref.: West).⁷ Secondary education is defined as having high school level, while university education is defined as having some college, a college degree, or more. Household income refers to the combined income of all family members during the last year and includes wages; net

7. See Table S2 in Supporting Information for summary statistics of the variables in our sample.

income from business, farm, or rent; pensions; dividends; interest; Social Security payments; and any other monetary income received by family members who are 15 years of age or older. Household income is coded with income brackets with the following values: 1 “Less than \$5,000,” 2 “\$5,000 to \$7,499,” 3 “\$7,500 to \$9,999,” 4 “\$10,000 to \$12,499,” 5 “\$12,500 to \$14,999,” 6 “\$15,000 to \$19,999,” 7 “\$20,000 to \$24,999,” 8 “\$25,000 to \$29,999,” 9 “\$30,000 to \$34,999,” 10 “\$35,000 to \$39,999,” 11 “\$40,000 to \$49,999,” 12 “\$50,000 to \$59,999,” 13 “\$60,000 to \$74,999,” 14 “\$75,000 to \$99,999,” 15 “\$100,000 to \$149,999,” and 16 “\$150,000 and over.” We consider the midpoint of each interval, and \$150,000 for the last interval, and we apply the log of the value of each interval to allow for nonlinearities in the effect of income.

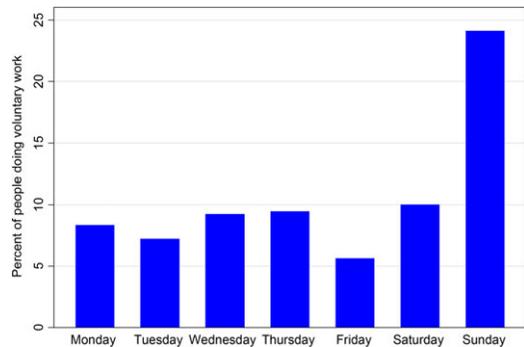
Furthermore, we include information on whether the activity of reference was done in the presence of others, with being alone as our category of reference. The reason is that the existing literature shows that activities done in the presence of others provide greater daily happiness compared to activities done alone. Also, volunteering often involves spending time with others, which is emotionally beneficial. Thus, we include dummy variables to control for whether the activity was done in the presence of household children, the spouse/partner, any other household adult, other close friends, or coworkers. Alternatively, we control for the time spent during the day with others at the diary level.

We also include day-of-week dummies (ref.: Friday) to control for the fact that the time restriction may become more binding during the week, as people who work normally must accomplish their work responsibilities on weekdays, and thus voluntary activities may be more personally enriching during the week, or more abundant at weekends. Figure 1 shows the distribution of voluntary activities in our sample for the seven days of the week, and it can be seen that around 25% of voluntary activities are done on Sundays. This is consistent with the previous hypothesis that time restrictions may become more binding during the week and people volunteer more during the weekends. This may also be related to religious participation, as many voluntary activities are done on Sundays at church, this being explored later.

We find that, in comparison with individuals who do not do any voluntary activity during the reference day, those who do represent a lower proportion of men and are older, and a higher

FIGURE 1

Participation in Voluntary Activities, by Day of the Week



Notes: Sample consists of episodes from non-retired/non-students respondents between 21 and 65 years old from the ATUS 2010 Well-Being Module. Participation in voluntary activities defined as a dummy variable that takes value “1” if the respondent devoted any time to voluntary activities during the day of the survey, and value “0” otherwise.

percentage have a university education, a smaller percentage work full time as opposed to part time, a higher percentage have at least one child aged under 18 years and live in couple, and have a higher household income, and they spend more time with children, the spouse/partner, and friends, while spending less time with coworkers. These differences show the importance of controlling for all these characteristics in the analyses that follow.

Finally, Kahneman and Krueger (2006) show that the level of tiredness increases during the day. That is, individuals report being more tired in late hours than in earlier hours. This may affect the differences between individuals if the selection of activities for those who volunteer was different compared to those who do not. To control for this time effect, we include in our analysis the time band of the day when the activity was done, and its square, measured in 1-hour time bands (e.g., 12–1 a.m., 1–2 a.m., etc.).

IV. RELATIONSHIP BETWEEN VOLUNTEERING AND DAILY HAPPINESS

In this section, we study the relationship between voluntary activities and daily happiness, by analyzing the relationship between feelings reported by the respondent and participation in voluntary activities on the same day. The large number of randomly selected episodes provides us with a solid framework for the analysis of

this relationship. We estimate a Random-Effects (RE) linear model to take into account the scaling effect of individuals (Kahneman and Krueger 2006). This implies that individuals may have a different conception of what the scale of measurement really refers to, or may interpret the scale differently, leading to a lack of independence across measures within a respondent. We estimate the following equation:

$$(1) E_{ij} = \alpha_i + \beta \text{Voluntary}_i + \gamma X_i + \delta \text{Day}_i + \varepsilon_{ij}$$

where E_{ij} represents the feeling of individual “ i ” in episode “ j ,” and α_i represents the individual effect.⁸ Voluntary_i is a dummy variable that indicates whether respondent “ i ” is engaged in any civic/voluntary activity (1) or not (0) during the day. Thus, Voluntary_i takes value “1” if we observe positive time devoted to voluntary activities in the diary of respondent “ i ,” and value “0” if we do not observe time devoted to such activities.⁹ According to the previously hypothesized relationship between feelings and voluntary activities, we should expect $\beta > 0$ for the net-affect (larger values indicate greater differences between happiness and negative feelings) and $\beta < 0$ for the u-index (happiness overcomes the feelings of stress, tiredness, sadness, pain). X_i represents a vector of socio-demographic characteristics, while ε_{ij} represents the error terms.

The window length used in the ATUS, as in other time-use surveys, may lead to measurement errors in the volunteering behavior of individuals, because individuals are asked what they did on the previous day, and it may well be that individuals do voluntary activities weekly

8. In our regressions, we will assume that happiness measures are cardinal, an interpretation that is common in the literature on well-being (Ferrer-i-Carbonell and Frijters 2004). We have alternatively estimated OLS linear models on the participation in civic activities, where we use robust errors clustered at the individual level. Results (shown in Table S3 of the Supporting Information) are robust in comparison with the RE linear model.

9. We have alternatively estimated our models considering the duration of voluntary activities, measured in hours per day. Results are less clear-cut (Table S4 in Supporting Information), as neither the u-index in all cases nor the net-affect when we exclude voluntary activities presents a statistically significant association with time spent in voluntary activities. Thus, the time spent in voluntary activities does not seem to be positively related to daily happiness, which can be explained by the fact that activities present diminishing marginal utility, at some point (Gershuny 2013), indicating that “prolonged exposure to highly enjoyable daily activities does not always foretell higher levels of cumulative subjective well-being, which is associated with balanced use of time rather than increased participation in individual activities” (Zuzanek and Zuzanek 2015, 1).

or monthly, but did no voluntary activities on the day before the survey. Thus, the shortness of the reference period for time diary studies potentially limits their usefulness for estimating the distribution of activities across populations, and the relationship between activities and daily happiness. Frazis and Stewart (2012) show that ordinary least squares (OLS) models are preferred in the analysis of time-allocation decisions, compared to tobit models, as the latter yield biased results. Gershuny (2012) argues that traditional diary studies can still produce accurate estimates of mean times in activities for samples and subgroups, at least in the short run. Foster and Kalenkoski (2013) compare estimation results from OLS and tobit models on child care time, and they obtain almost identical results. Thus, we rely on RE linear models.

Table 3 shows the results of estimating Equation (1) on participation in voluntary activities throughout the day. Columns (1) and (2) refer to RE model for the net-affect and u-index, respectively, considering all activities. We observe a positive association between the net-affect and participation in voluntary activities on the diary day, and a negative association between the u-index and participation in voluntary activities on the diary day, with these associations being statistically significant at standard levels. Participation in voluntary activities on the diary day is associated with an increase and a decrease of 0.285 and 0.035 in the net-affect and the u-index, respectively, representing an increase and a decrease of 10% and 13%, respectively, in the overall values. Hence, we find that $\beta > 0$ for the net-affect and $\beta < 0$ for the u-index, which is consistent with the hypothesis that voluntary activities are positively related to the daily happiness of individuals.

In the analyzed relationship, it could be that those who devote time to voluntary activities obtain more daily happiness from their voluntary activities, as seen in Table 2, but in the other activities, they report similar levels of daily happiness. Thus, we now estimate the same models, excluding all episodes that were voluntary activities (we exclude 458 episodes). Columns (3) and (4) refer to RE models for the net-affect and u-index, respectively, excluding episodes of voluntary activities. We observe that, for both the net-affect and u-index, we obtain statistically significant positive and negative associations with participation in voluntary activities on the diary day. Thus, the positive association between voluntary activities and increased daily

TABLE 3
Results for Participation in Voluntary Activities

	(1) Net-Affect	(2) u-Index	(3) Net-Affect	(4) u-Index
Volunteering in diary	0.285*** (0.064)	-0.035*** (0.010)	0.248*** (0.067)	-0.031*** (0.011)
Male	0.091** (0.045)	-0.041*** (0.007)	0.092** (0.045)	-0.041*** (0.007)
Age	-0.064*** (0.016)	0.008*** (0.003)	-0.065*** (0.015)	0.008*** (0.002)
Age squared	0.069*** (0.018)	-0.009*** (0.003)	0.070*** (0.018)	-0.009*** (0.003)
University education	-0.092 (0.100)	0.016 (0.014)	-0.088 (0.083)	0.015 (0.014)
Secondary education	0.013 (0.103)	0.007 (0.014)	0.011 (0.085)	0.006 (0.014)
Working full time	0.495*** (0.059)	-0.063*** (0.009)	0.501*** (0.056)	-0.064*** (0.009)
Working part time	0.515*** (0.070)	-0.080*** (0.011)	0.518*** (0.068)	-0.082*** (0.011)
Number of children <18 years	-0.069 (0.058)	0.019* (0.010)	-0.071 (0.057)	0.020** (0.009)
Married	0.248*** (0.057)	-0.040*** (0.009)	0.252*** (0.055)	-0.041*** (0.009)
Household Income	0.134*** (0.030)	-0.020*** (0.005)	0.133*** (0.027)	-0.020*** (0.004)
Presence of child	0.419*** (0.038)	-0.063*** (0.008)	0.428*** (0.036)	-0.064*** (0.008)
Presence of spouse/partner	0.331*** (0.036)	-0.031*** (0.008)	0.330*** (0.036)	-0.030*** (0.008)
Presence of household adult	0.168 (0.125)	-0.013 (0.025)	0.202* (0.106)	-0.017 (0.022)
Presence of well-known people	0.524*** (0.040)	-0.062*** (0.008)	0.532*** (0.040)	-0.063*** (0.008)
Presence of coworkers	-0.302*** (0.054)	0.043*** (0.012)	-0.301*** (0.049)	0.042*** (0.011)
Total time with child	0.009 (0.021)	0.000 (0.003)	0.006 (0.018)	0.001 (0.003)
Total time with spouse/partner	-0.003 (0.018)	0.000 (0.003)	0.000 (0.018)	0.000 (0.003)
Total time with household adult	-0.019 (0.051)	0.000 (0.007)	-0.036 (0.045)	0.002 (0.008)
Total time with well-known people	-0.010 (0.012)	0.004* (0.002)	-0.011 (0.012)	0.004** (0.002)
Total time with coworkers	0.027 (0.017)	-0.003 (0.003)	0.027* (0.016)	-0.004 (0.003)
Constant	1.718*** (0.421)	0.516*** (0.071)	1.728*** (0.413)	0.519*** (0.069)
Volunteering episodes in sample	Yes	Yes	No	No
Observations	25,601	25,601	25,143	25,143
R-squared	0.036	0.055	0.035	0.055

Notes: Sample consists of non-retired/non-students respondents aged 21–65 years from the ATUS 2010 Well-Being Module. Robust standard errors are in parentheses. Columns (1) and (2) refer to RE models for the net-affect and u-index respectively, considering all the activities. Columns (3) and (4) refer to RE models for the net-affect and u-index respectively, excluding episodes of voluntary activities. We also include day-of-week dummies in all of the regressions (ref.: Friday), variable dummies to control for residence in the Northeast, Midwest, and South (ref.: West.), and the time of the day (e.g., time band) and its square.

*Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level.

happiness is still present, even if we exclude episodes of voluntary activities from the analysis. The results point toward voluntary activities increasing the happiness obtained during non-voluntary activities, which would be consistent with the consumption motive of volunteering, as

it seems to increase the contemporaneous utility of individuals.

As an additional analysis, we have studied how religion, volunteering, and daily happiness are related. Various studies have highlighted the link between religion/religiosity and happiness

(e.g., Clark and Lelkes 2005; Hayo 2004; Helliwell 2003), and our data show that a disproportionate share of voluntary activities take place on Sunday, which happens to be a day of high church attendance for religious individuals in the United States. Thus, it could be that people who do voluntary activities during the day also go to church or other places of worship, and thus the greater daily happiness experienced by those who volunteer can be explained to some extent by the fact that they went to church. We need to net out the relationship between voluntary activities and daily happiness from the effect of religion or participation in religious activities, given that these activities have been shown to be in the third position in terms of daily happiness (overall net-affect and u-index of 4.007 and 0.127, respectively). We have carried out three different analyses (available upon request) to deal with the issue of religion/religious activities, and we obtain consistent results, indicating that our results are not driven by religion.

V. VOLUNTARY ACTIVITIES: “TIME-COMPOSITION” AND “ACTIVITY” EFFECTS

Given the previously reported positive association between voluntary activities and daily happiness, in this section, we decompose the difference in daily happiness between volunteers and non-volunteers into two components: the “time-composition” and “activity” effects. The former captures the difference in the daily happiness that can be attributed to differences in the distribution of activities during the day. To the extent that different activities provide different levels of daily happiness to individuals, including voluntary activities that have been shown to be ranked among the five most enjoyable, the difference in daily happiness between volunteers and non-volunteers can be explained because those who volunteer during the day may differ in how they spend their time, compared to those who do not volunteer. The latter captures the variations in daily happiness that can be attributed to differences in happiness obtained while engaged in similar activities. That is to say, volunteers and non-volunteers report different levels of daily happiness when engaged in the same activities during the day, what we call the “activity” effect.

We first analyze differences in the time devoted to different activities and the associated net-affect and u-index, broken down by participation in voluntary activity, shown in

Table 4.¹⁰ Activities are sorted following the ranking in the net-affect shown in Table 2, although we place voluntary activities in the first position. We compute the difference between the two groups in the net-affect, the u-index, and the time devoted to each activity, and we compute the p value of that difference (t -type test of equality of means), where a p value lower than 0.05 indicates that the difference between the two groups is statistically significant at standard levels.

Regarding the time devoted to the different activities, we find that volunteering individuals take up 102.733 minutes during the day and, compared to individuals who do not volunteer, they devote more time to out-of-home leisure (8.881 more minutes), religious activities (0.115 more minutes), teaching child care (1.790 more minutes), basic child care (7.477 more minutes), cooking and meals (4.011 more minutes), shopping (3.502 more minutes), and housework (7.187 more minutes). On the contrary, individuals who volunteered during the day of the survey devote less time to sports/exercise (4.609 fewer minutes), gardening/pet care (4.189 fewer minutes), leisure travel (2.524 fewer minutes), TV watching (58.645 fewer minutes), commuting/work-related activities (9.045 fewer minutes), main work (109.288), job search (2.648 fewer minutes), and own medical care (4.010 fewer minutes). Thus, in comparison to individuals not doing voluntary activities, those who volunteer spend around 120 more minutes on voluntary activities, out-of-home leisure, religious activities, supervisory child care, and basic child care, while they spend fewer minutes doing market work, activities related to work, and TV watching. According to Table 2, the former group of activities produce higher levels of individual happiness, while the latter group of activities produce lower levels of happiness. Thus, this “composition” effect may explain the differences in the average daily happiness of those who devote time to voluntary activities.

10. The *net-affect* and *u-index* are computed at the episode level, while the time devoted to each of the activities is computed at the diary level (i.e., for each individual, we sum the time devoted to the reference activity during the day and compute the overall time devoted to this activity by all individuals in the reference sample). The time devoted to the different activities is measured in minutes per day. The classification of activities corresponds to the basic classification of Aguiar and Hurst (2007) and Gimenez-Nadal and Sevilla (2012). Although sleeping is not reported, we computed the time devoted to it to see if there is any difference between the two groups of individuals.

TABLE 4
Time Use and Daily Happiness by Activity and Participation in Voluntary Activities

	Time				Net-Affect				u-Index			
	V	NV	Diff	<i>p</i> Value Diff	V	NV	Diff	<i>p</i> Value Diff	V	NV	Diff	<i>p</i> Value Diff
Voluntary activities	102.733	—	—	—	3.483	—	—	—	0.194	—	—	—
Supervisory child care	7.030	7.511	-0.481	(0.68)	4.984	4.503	0.481	(0.18)	0.092	0.061	0.031	(0.60)
Out-of-home leisure	30.765	21.883	8.881	(0.00)	4.537	4.126	0.411	(0.02)	0.060	0.092	-0.032	(0.35)
Religious activities	0.117	0.003	0.115	(0.00)	4.043	3.828	0.214	(0.60)	0.115	0.189	-0.075	(0.16)
Teaching child care	7.490	5.700	1.790	(0.03)	2.167	3.751	-1.583	(0.00)	0.297	0.151	0.146	(0.04)
Sports/exercise	10.423	15.032	-4.609	(0.00)	2.919	3.447	-0.527	(0.17)	0.295	0.150	0.144	(0.03)
Basic child care	29.950	22.474	7.477	(0.00)	3.342	3.409	-0.067	(0.65)	0.201	0.195	0.006	(0.82)
Eating	52.273	52.920	-0.647	(0.67)	3.374	3.343	0.031	(0.82)	0.159	0.179	-0.020	(0.36)
At-home leisure	60.175	62.059	-1.884	(0.59)	3.363	3.263	0.100	(0.60)	0.174	0.209	-0.034	(0.25)
Reading/listening	16.449	15.688	0.760	(0.62)	2.694	3.177	-0.483	(0.23)	0.338	0.187	0.151	(0.04)
Gardening/pet care	14.563	18.753	-4.189	(0.03)	3.549	3.059	0.490	(0.14)	0.151	0.229	-0.078	(0.21)
Leisure travel	12.407	14.931	-2.524	(0.09)	3.332	2.984	0.348	(0.10)	0.207	0.197	0.009	(0.80)
Personal care	15.966	13.988	1.978	(0.12)	3.205	2.966	0.239	(0.30)	0.222	0.192	0.030	(0.47)
Cooking meals	39.129	35.118	4.011	(0.02)	3.215	2.953	0.263	(0.10)	0.191	0.224	-0.033	(0.25)
Adult care	11.737	11.734	0.003	(1.00)	2.635	2.975	-0.340	(0.43)	0.494	0.255	0.239	(0.00)
Writing/paperwork	18.009	18.470	-0.461	(0.78)	3.007	2.782	0.225	(0.38)	0.157	0.282	-0.125	(0.02)
TV watching	91.447	150.092	-58.645	(0.00)	2.995	2.668	0.326	(0.10)	0.281	0.263	0.018	(0.61)
Shopping	31.433	27.931	3.502	(0.05)	2.651	2.650	0.001	(1.00)	0.284	0.287	-0.003	(0.95)
Commuting/work-related	14.261	23.306	-9.045	(0.00)	3.024	2.618	0.406	(0.08)	0.188	0.272	-0.084	(0.08)
Other housework	27.694	28.324	-0.630	(0.70)	2.807	2.604	0.203	(0.22)	0.230	0.273	-0.043	(0.15)
Education	1.298	2.183	-0.885	(0.34)	3.283	2.360	0.923	(0.58)	0.000	0.279	-0.279	(0.30)
Housework	49.625	42.439	7.187	(0.01)	3.007	2.263	0.744	(0.00)	0.183	0.305	-0.122	(0.00)
Main work	166.082	275.370	-109.288	(0.00)	2.043	2.285	-0.242	(0.25)	0.281	0.331	-0.050	(0.25)
Home/car maintenance	4.120	5.781	-1.661	(0.15)	2.370	2.061	0.309	(0.60)	0.426	0.293	0.133	(0.27)
Job search	2.615	5.263	-2.648	(0.05)	-0.150	1.620	-1.770	(0.14)	0.892	0.481	0.411	(0.11)
Own medical care	0.961	4.971	-4.010	(0.01)	0.203	-0.073	0.276	(0.82)	0.544	0.742	-0.198	(0.26)
Sleeping	495.884	501.801	-5.917	(0.17)	—	—	—	—	—	—	—	—

Notes: Sample consists of episodes from non-retired/non-students respondents aged 21–65 years from the ATUS 2010 Well-Being Module. Means are computed using the original weights included in the survey. For time spent in the different activities, we consider the information at the diary level, taking the total time devoted to the reference activity during the day. We show the difference in time use and happiness between volunteers and non-volunteers, and the *p* values of the difference based on a *t*-test type test are shown in parentheses.

If we look at the differences in the net-affect and the u-index between the two groups, we find that for both measures, individuals volunteering during the day of the survey obtain a higher level of happiness from commuting/work-related activities (differences in the net-affect and u-index are 0.406 and -0.084, respectively) and housework (differences in the net-affect and u-index are 0.744 and -0.122, respectively), while they obtain less happiness from supervisory child care (differences in the net-affect and u-index are -1.583 and 0.146, respectively). Thus, it seems that volunteers obtain a different level of daily happiness while engaged in commuting/work-related activities, housework, and supervisory child care, pointing to an “activity” effect: when engaged in similar activities, those who devoted time to voluntary activities during the day of the survey feel happier than those who did not.

To disentangle the extent to which each of the effects contributes to the previously reported differences in daily happiness between the two groups, we follow Knabe et al. (2010) by

decomposing the difference in our two measures of daily happiness by a simulation. First, we calculate how the average experienced utility of all volunteers would change if they did no voluntary activities, under the assumption that they experience the average utility of a non-volunteer in all activities, but maintain the time schedule they had when they were doing voluntary activities (i.e., well-being as counterfactual).¹¹ The difference between the experienced utility while doing voluntary activities and its value after this hypothetical change corresponds

11. Here, we must consider that the time devoted to sleep is slightly different, although the difference is not statistically significant at standard levels, between the groups. Rather than considering the total time devoted to the activity, we multiply by the *net-affect/u-index* of reference for each activity and then divide the sum of the product by the waking time, to obtain a measure of experienced utility during the day. We directly divide the average time devoted to the activity divided by the waking time (820 and 880 minutes per day for volunteers and non-volunteers, respectively) and multiply for the corresponding affective measure. As we do not observe experienced utility ratings for voluntary activities for non-volunteers, we assume that volunteers maintain their original values.

TABLE 5
Decomposition of Difference in Daily Happiness

<i>Panel A: Counterfactual based on different affective well-being</i>		
Volunteering	3.113	0.194
Activity effect	0.179	-0.020
	(46%)	(28%)
Time-composition effect	0.206	-0.051
	(54%)	(72%)
Non-volunteering	2.728	0.265
Difference volunteering/ non-volunteering	0.385	-0.071
<i>Panel B: Counterfactual based on different uses of time</i>		
Volunteering	3.113	0.194
Activity effect	0.042	-0.018
	(11%)	(25%)
Time-composition effect	0.343	-0.053
	(89%)	(75%)
Non-volunteering	2.728	0.265
Difference volunteering/ non-volunteering	0.385	-0.071

Notes: Sample consists of non-retired/non-students respondents aged 21–65 years from the ATUS 2010 Well-being Module. Activity weights are used and computed as the proportion of the activity out of the total waking time. Parentheses show the percentage of the difference that can be explained by each effect.

to the “activity” effect; the remaining difference in the experienced utility associated with not volunteering can then be assigned to the “time-composition” effect.

The decomposition of these two effects, using the well-being measures as counterfactual, is shown in Panel A of Table 5. The net-affect for those who devote time to voluntary activities, using the net-affect values of those who do not volunteer, is 2.907 (see Table S5 for details of calculations), which when compared with the real value of 3.113 of the net-affect of this group, indicates that the “activity” effect accounts for 0.179 of the 0.385 difference in the net-affect. Thus, of the 0.385 difference in the net-affect between the two groups, the “activity” effect explains 46 % (0.179 out of 0.385), while the “time-composition” effect explains 54% (0.206 out of 0.385) of the difference. We find that the u-index for those who volunteer, using the u-index values of those who do not, is 0.245, which when compared with the real value of 0.194 of the u-index of this group indicates that the “activity” effect accounts for -0.020 of the -0.071 difference in the u-index. Thus, of the -0.071 difference in the u-index between the two groups, the “activity” effect explains 28 % (-0.020 out of -0.07), while the “time-composition” effect

explains 72% (-0.051 out of -0.07) of the difference. If, rather than considering individuals who volunteer as the reference group, we consider those who do not volunteer, and use the affective measures of individuals who do volunteer as the counterfactual (Panel B), we observe that for the net-affect and the u-index, the “activity” effect accounts for 0.042 and -0.018 of the difference between the two groups, respectively, representing 11% and 25% of the difference.

In sum, we find that the difference in daily happiness between volunteers and non-volunteers can be decomposed into two components: the “activity” and “time-composition” effects. While the “time-composition” effect is large, as it explains between 54% and 89% of the difference in daily happiness between the two groups, the “activity” effect on other activities is smaller but still significant, as it explains between 11% and 46% of the observed difference in daily happiness during the day.

We offer a decomposition of the two channels that may help to explain the difference in daily happiness between volunteers and non-volunteers, on a daily basis. However, this decomposition only provides lower and upper limits of the part each effect is able to explain. In the case of the “activity” effect, while 11% may seem a small effect, 46% is significant. Additionally, we do not know what factors may comprise this “activity” effect (social networks, extraversion, motivations, etc.). Additionally, the “time-composition” effect shows that volunteers devote less time to market work activities, which may indicate that they also work less.

VI. CONCLUSIONS

Working for no pay is a widespread economic activity whose significance is not yet fully understood. In the United States, around 50% of all adults do some kind of volunteering, equivalent to five million full-time jobs (Anheier and Salamon 1999). Thus, understanding the reasons why individuals do such work has been the focus of a significant amount of research. In this article, we analyze voluntary activities, with a focus on how participation of this type is associated with individual happiness.

Using the *Well-Being Module* of the ATUS 2010, we find that participation in voluntary activities is positively associated with the daily happiness of individuals, as individuals who volunteer report higher values of the net-affect and

lower-values of the u-index. These results are maintained when we control for the scaling effect of individuals and when we exclude episodes of voluntary activities from the analysis, and the variations are not driven by participation in religious activities. Finally, we decompose the difference in daily happiness between volunteers and non-volunteers into a “time-composition” and “activity” effect, and find that the “activity” effect explains between 11% and 46% of the difference in happiness between volunteers and non-volunteers during the day.

To the extent that volunteering is positively related to the daily happiness of individuals, it may be of interest for employers, given the existing research that has found a positive relationship between happiness and worker productivity (Bockerman and Ilmakunnas 2012; Freeman 1978; Oswald, Proto, and Sgroi 2015). Studying the extent to which volunteers are more productive in the firm posits an interesting line of future research. If volunteers are more productive workers, employers may consider this voluntary work as a marker for productivity. However, volunteers devote less time to market work, an effect that appears to be negative in terms of productivity. It would be of interest to see which effect is dominant. Furthermore, the “activity” effect may account for a significant part of the difference between volunteers and non-volunteers. Analyzing the extent to which volunteers differ in their non-observable characteristics (motivations, social context, social networks, trust, etc.) may be of interest. Additionally, the fact that volunteers devote comparatively less time to watching TV may help media channels to focus their commercial campaigns and programming according to audience demographics. Finally, regarding the causal relationship between daily happiness and volunteering, we cannot talk about the causality of the effect, although the evidence presented in this article may provide a promising line of research. We leave these issues for future research.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Table S1. Classification of Activities, American Time Use Survey 2010

Table S2. Summary Statistics of Demographic Characteristics of the Sample

Table S3. Results for Participation in Voluntary Activities, OLS Results

Table S4. Results for Time in Voluntary Activities

Table S5. Computation of the "Time-composition" and "Activity" Effect