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**Crime and Mental Wellbeing**

**Francesca Cornaglia and Andrew Leigh**

## **Abstract**

Most estimates of the cost of crime focus on victims. Yet it is plausible that an even larger cost of crime occurs via its indirect impact on the mental wellbeing of non-victims. To test how crime affects individuals' mental outcomes, we exploit detailed panel data on mental wellbeing, allowing us to observe the relationship between changes in crime in a local area and changes in the mental wellbeing of resident non-victims in that area (controlling for changes in local economic conditions). Our results suggest that increases in crime rates have a negative impact on the mental wellbeing of residents, with the biggest impacts arising from violent crime. We also find that local press coverage of criminal activity enhances the effect of crime on mental well-being.

JEL Classifications: I18, K14, R28

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Francesca Cornaglia is a Research Associate of the Centre for Economic Performance, London School of Economics. She is also a Lecturer in the Department of Economics, Queen Mary University London. Andrew Leigh is the federal Member of Parliament for Fraser, Australia. He was previously a Professor of Economics at the Australian National University.

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## 1. Introduction

In 2006, the US Senate Judiciary Committee heard evidence from two sources on the economic cost of crime. The director of the Bureau of Crime Statistics told the committee that according to victimization surveys, the financial cost of crime to victims and their families is \$16 billion annually. Immediately afterwards, economist Jens Ludwig told the committee that, based on survey respondents' willingness to pay to reduce crime in their communities, the cost of crime to victims is \$694 billion per year.<sup>1</sup>

This 40-fold disparity between direct victimization costs and willingness to pay to reduce crime suggests an intriguing notion. What if most of the social cost of crime is not suffered by victims, but by non-victims? What if the net impact of crime on those who are killed, assaulted or robbed is just the tip of the iceberg in calculating crime costs?<sup>2</sup>

The notion that crime costs to non-victims may be important was noted by English jurist Jeremy Bentham (1781), through the example of a man who is robbed on a road. The "primary mischief", wrote Bentham, arise from the physical harm and loss of possessions occurring from the robbery. But the crime also has a "secondary mischief".

*"The report of this robbery circulates from hand to hand, and spreads itself in the neighbourhood. It finds its way into the newspapers, and is propagated over the whole country. Various people, on this occasion, call to mind the danger which they and their friends, as it appears from this example, stand exposed to in travelling; especially such as may have occasion to travel the same road."*

What is important about this effect of crime (which Bentham referred to as "the alarm") is that it affects a much larger number of people than the direct impact of crime. As Wolff (2005) points out, even if the probability of harm is

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<sup>1</sup> Testimony given on 19 September 2006 to the United States Senate Committee on the Judiciary's inquiry on 'The Cost of Crime: Understanding the Financial and Human Impact of Criminal Activity'.

<sup>2</sup> Estimates of the economic costs of crime in countries other than the United States have tended to note that the fear effect may be very important, but not include it in estimates of the cost of crime. See for example Walker (1997) for Australia; Brantingham and Easton (1998) for Canada; and UK Home Office (2005) for the United Kingdom.

very low, “the fear can be ever-present for a great number of people, depressing their lives”.

In this paper, we provide the first empirical estimates of the impact of crime on non-victims, using a unique dataset that allows us to measure the same individuals’ wellbeing over successive years, and to separate victims from non-victims. Our goal is to estimate the magnitude of the effect of different types of crime in the immediate area of residence on mental well-being, accounting for sorting of individuals with different mental health outcomes across areas with different crime rates. Our outcome measure is based on detailed and repeated survey information that allows distinction of different dimensions of mental well-being. By matching each individual to detailed local-area crime statistics for various types of crimes, and using repeated information of both area criminal activity and measures of mental well-being, as well as information on victimization, we are therefore able to assess the effect that different types of crimes have on the mental wellbeing of non-victims.

Another contribution of our paper is to address the role of local media coverage in enhancing the effect of area crime rates on mental well-being. Our focus is on the interaction between area crime rates, and coverage by local media. Extensive coverage of crime incidences in local newspapers may exacerbate the effect of area criminal activity on the mental well-being of non-victims, and there exists a literature on the relationship between media coverage of crime on fear (see e.g. Gerbner et al. 1986). However, to our knowledge no work quantifies the effect, and – more importantly - assesses the “multiplier” effect of area crime through media coverage on mental wellbeing.

Our data is unique in that it contains information on victimization. That allows us to eliminate victims from the analysis, thus concentrating on the effects crime has on non-victims. Further, and to benchmark our results, we investigate the effects of victimization on mental well-being of individuals. Here a problem is that individuals who are more likely to be victimized may at the same time experience lower mental well-being. To address this sorting problem, we condition on individual fixed effects. To estimate the effects of crime on the mental well-being of victims, taking account of sorting in this way, is in itself an important contribution as- to our knowledge –no study exists that links

measures of mental well-being to victimization of different crimes, taking account of the selection of vulnerable individuals into crime incidences.

Our research is related to two distinct literatures. First, a number of studies that look at the effect of neighborhoods on individuals' mental wellbeing show that individuals in disadvantaged neighborhoods tend to have worse mental health outcomes (see eg. Aneshensel and Sucoff 1996; Schulz et al. 2000; Ross 2000; Stafford and Marmot 2003; Stafford, Chandola and Marmot 2007)<sup>3</sup>. However, most of these studies lack a convincing research design to establish the causality of any measured relationship. As Propper et al. (2006) point out, it is difficult to know whether these studies reflect the impact of places on people, or merely the correlation between neighborhood choice and mental wellbeing.<sup>4</sup> One way of disentangling this issue is by exploiting some random variation in the neighborhoods where individuals live. Based on the *Moving to Opportunity* (MTO) experiment, Katz, Kling and Liebman (2001), Kling, Liebman and Katz (2001), and Kling et al. (2004) do just that. Their findings suggest that a primary reason that participants wished to move out of public housing was fear of crime.<sup>5</sup> And indeed, one of the major impacts of receiving a housing voucher to move into a low-poverty neighborhood was a reduction in crime victimization and improved mental wellbeing.<sup>6</sup> We add to this literature, by providing a direct assessment of the effect of area crime on mental well-being. Although we do not have a random experiment, the repeated information on both mental wellbeing and crime allows us to eliminate sorting effects.

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<sup>3</sup> Other authors look at life satisfaction. For instance Shields, Wheatley Price and Wooden (2009) using Australian data find evidence that where you live plays a significant role in determining your life satisfaction.

<sup>4</sup> Propper et al. (2006) estimate the relationship between neighborhood characteristics and changes in mental health. However, their data do not allow them to estimate the relationship between changes in neighborhood characteristics and changes in mental health.

<sup>5</sup> Katz, Kling and Liebman (2001) conclude that "Based in part on evidence from the extensive qualitative interviews that have been done with MTO participants and the strong associations shown in the MTO quantitative research, we believe that the leading hypothesis for the mechanism that produces the mental health improvements involves the reduction in stress that occurred when families moved away from dangerous neighbourhoods in which the fear of random violence influenced all aspects of their lives." (p.102)

<sup>6</sup> Suggestive evidence can also be found in Oreopoulos (2003), who exploits quasi-experimental variation in public housing assignments in Toronto. Although children who grew up in larger projects had similar labor market outcomes to those in smaller projects, Oreopoulos notes that the vast differences in crime rates between the two types of projects may well have had an impact on residents' life satisfaction and health status.

Second, a number of economic studies have attempted to identify the net cost of crime (to victims and non-victims) by using revealed preference techniques. Assessment of these net costs is particularly important from a policy perspective. One approach has been to look at the effect of changes in crime risk on house prices (Thaler 1978; Schwartz Susin and Voicu 2003; Gibbons 2004; Linden and Rockoff 2006). While this reduced-form approach has the advantage that it does not ignore the fear of crime, it has the drawback that one cannot separately identify the direct and indirect costs of crime. Unless we can directly observe the cost of crime to victims, *and* fear of crime is directly proportional to the probability of crime, it is not possible to disentangle the two.<sup>7</sup> Our approach, adds to this literature by isolating the direct relationship between area crime and mental well-being.

The remainder of the paper is structured as follows. In section 2, we present the data. In section 3, we discuss the methodology we follow for our analysis. In section 4, we present our results, discussing the impact of crime on both victims and non-victims. The final section reviews the implications of our findings and concludes.

## **2. Background**

Our empirical analysis is for Australia. By developed country standards, crime rates in Australia are high. For example, in the 2000 International Crime Victims Survey, covering 17 countries, a higher share of Australians reported that they had been the victim of a crime in the previous 12 months than in any other nation, including the United States (Kesteren, van Mayhew and Nieuwbeerta 2000). This suggests that Australia may be a good context in which to explore the relationship between crime and mental wellbeing. In the next section, we explain the data we use for our analysis. We then explain the mental

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<sup>7</sup> A particular example may serve to clarify the issue. Using quasi-random variation in the location of sex offenders, Linden and Rockoff (2006) estimate that a single offender depresses property values in the immediate vicinity by \$4,500-\$5,500 per home. The authors note that if (a) all of the decline in property value is due to increased crime risk; and (b) neighbors' perceptions of risk are in line with objective data, then they can use this figure to estimate the cost of being a victim of sexual assault. However, if fear of crime has a direct psychic cost (violating assumption a), or homeowners overestimate crime risk (violating assumption b), their methodology is likely to overstate the costs of victimization.

well-being outcomes we analyze, and provide some descriptive statistics on crime and our outcome variables, as well as regional and personal background characteristics.

## **2A. Data on Crime**

Since local area crime statistics are held at LGA (Local Government Area) level in Australia, we separately approached each state and territory government to request these data. In some cases, this involved filing requests under the relevant Freedom of Information Acts, although these really served only to prompt the relevant data-holders, and ultimately none of the data were obtained in this manner. Eventually, we were able to obtain data for seven of the eight states and territories, covering 99 percent of the Australian population. Since the states do not apply a uniform crime classification system, we recoded crimes into 16 categories using the Australian Standard Offence Classification (ASOC) (though most of our results are based upon the overall crime rate<sup>8</sup>).

In modeling neighborhood effects, an important consideration is the appropriate geographic unit. We opted to use local government areas as our unit of aggregation. The typical respondent in our survey lived in a local government area with a population of approximately 91,000 people (the interquartile range is 37,000 to 151,000 people). Local government areas often correspond (but not always) to the circulation areas of local newspapers. Below we will test whether newspaper coverage of crime amplifies the effects of crime on mental well-being.

In our analysis, we concentrate on individuals living in metropolitan Australia, such as Sydney, Melbourne, and Canberra. We distinguish between 143 metropolitan areas. These areas are made up of 388 local government areas. Since Australians mainly live in cities, by restricting the analysis to metropolitan areas, we use 63 percent of the overall Australian population.

In Table 1, we report crime rates for the years 2001 – 2006, which is the period we consider below. In the Table, we distinguish between property crimes and violent crimes – a distinction which we will follow in much of our analysis

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<sup>8</sup> In Appendix Table 1, we show which of the 16 crime categories we assign to property and violent crime. Panel A refers to violent crime, and Panel B to property crime. Column (1) reports a brief description of the type of crime, and column (2) provides examples of the crime category. The choice of the crime categories to be included in our analysis was based on both on the basis of incidence rate and likelihood of impact on mental health.

below. In the Table, we report in the first column the crime rates in the respective category<sup>9</sup>, and we give the standard deviation in parenthesis underneath the table entry.

It is apparent from Table 1 entries that crime has been reduced quite considerably over the period we consider here. This seems to be driven by the sharp reduction in property crime. This is in contrast to the US where property crime over the period we consider did not change substantially.<sup>10</sup> While the criminology literature has not reached a consensus on the factors that explain this drop, possible explanations include changes in the age structure, shifts in heroin supply, reduced availability of firearms, and improved antitheft devices in new motor vehicles (see eg. Moffatt and Poynton 2006; Brickell 2008).

## **2 B. Data on Mental Well-being and Individual Characteristics**

The data on mental well-being, as well as respondents' background information, are drawn from the Australian "Household, Income and Labour Dynamics in Australia" (HILDA) survey, a household-based panel study which began in 2001. Our observation window is the period between 2001-2006. The survey is unique, in that it administers in each wave a detailed measure of mental wellbeing, based on the 36-Item Short Form Health Survey (SF-36). With the restricted use version of the HILDA dataset (which contains information on the respondent's postcode and the date of interview), we are able to match each individual to the crime rate in their local government area during the period when they answered the questionnaire. The main outcome variable we use for our analysis is the mental well-being of respondents. In addition, the survey interviews individuals in each wave about whether they have been victims of crime, which allows us to distinguish the responses of victims and non-victims.

The SF-36 is a multi-purpose, short-form health survey with 36 questions<sup>11</sup>. It is a generic measure, as opposed to one that targets a specific age, disease, or treatment group and its reliability in terms of internal consistency

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<sup>9</sup> Crime = crime / (population/100,000)

<sup>10</sup> Property crime over the period 2000-2006 stayed more or less constant in the U.S. (Source: FBI Uniform Crime Reports).

<sup>11</sup> We report the 36 survey questions in Appendix Table 2.



and stability over time has been tested and found to meet psychometric criteria<sup>12</sup>. The SF-36 survey was developed as part of the Medical Outcomes Study (MOS)<sup>13</sup>. These measures rely upon patient self-reporting and are now widely utilized by managed care organizations and by Medicare for routine monitoring and assessment of care outcomes in adult patients. The SF-36 has also been used to answer economic questions like the relationship between mental health and labour market participation (Frijters, Johnston and Shields, 2010).

The 36 items-questions can be grouped into two broad sub-groups: Physical Health and Mental Health. Within each sub-group, questions are combined to express more detailed expressions of well-being. Here we will focus on mental health outcomes. The 14 questions that refer to mental health are used to construct four multi-item scales, each of which measures a particular aspect of mental well-being. In particular these are: 1. The Vitality scale, a measure of tiredness (constructed using 4 items); 2. The Social Functioning score (constructed using 2 items), which picks up the interference of physical or emotional problems with normal social activities; 3. The Role Emotional scale (constructed using 3 items), a measure of the difficulties with daily activities because of emotional problems; and 4. The Mental Health scale (constructed using 5 items), a measure of nervousness and depression. These scales can be aggregated into a summary measure of mental wellbeing – the Mental Component Summary (MCS) – using a standard scoring algorithm based on a factor analytic technique that forces the scores to be orthogonal.<sup>14</sup>

Table 2 summarizes the meaning of the lowest and highest possible scores of the four SF-36's mental health scales (columns 1 and 2 respectively)<sup>15</sup>. In the last 2 columns of Table 2 (columns 3 and 4 respectively) we report the

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<sup>12</sup> See for instance Stewart Hays and Ware (1988) and McHorney Ware and Raczek (1993).

<sup>13</sup> The Medical Outcome Study is a two-year study of patients with chronic conditions. The survey measures of quality of life include physical, mental, and general health (Tarlow et al, 1989).

<sup>14</sup> In Appendix Table 3 we illustrate which questions are used to construct the 4 mental health scales and the mental health summary measure that we use in our analysis. The scores are available in the HILDA dataset for all years 2001-2006. For information about the construction of the scales and summary measures see <http://www.sf-36.org/tools/sf36.shtml>.

<sup>15</sup> Scores for all four mental health scales are from zero to 100, where 100 indicates the highest level of wellbeing in each dimension.

means and the standard deviations of each of the four measures we consider in the analysis.

The literature on fear of crime has consistently found an association between fear and subjective measures of mental health (e.g. Strafford Chandola and Marmot 2007, Ross and Mirowsky 2001, Whitley and Prince 2005, Jackson and Stafford 2009). Green Gilbertson and Grimsley, 2002 use the SF-36 as a measure of mental health and find that feeling safe positively relates to all five dimensions of mental health. The different scales however refer to different symptoms and, for the purpose of our study, these are likely to pick up different types of disturbances that may be caused by crime incidences. Guite Clark and Ackrill (2009) focus on the Vitality and the Mental Health scale and confirm an association between the physical environment and these two dimensions of mental well-being. However, to our knowledge, no study examines the direct relationship between local area crime and different mental health measures.

In Table 3 we summarize the individual characteristics of the respondents in our data, where we report in the first column means for all individuals in the sample. In the next two columns, we distinguish between individuals who have been victims of crime in the 12 months before the interview, and individuals who have not. Finally, in the last two columns (column 4 and 5), we focus on victims of crime, but distinguishing between those who were victims of a property crime (column 4), and those who were victims of a violent crime (column 5).

The Table entries suggest that victims and non-victims are slightly different in their characteristics. Victims of property crime tend to be slightly better educated, while victims of violent crime are less well educated. Victims are younger than non-victims, in particular victims of violent crime, which probably partly explains why victims have fewer children. Most importantly, victims, in particular those who are victims of violent crimes, have lower mental health outcomes in any of the categories measured.

Our analysis also accounts for two other time-varying characteristics known to affect mental wellbeing: the local area unemployment rate, and the share of rainy days. The unemployment rate is included in order to capture the

possibility that local economic booms or busts may affect both crime and mental wellbeing (see eg. Kapuscinski, Braithwaite, and Chapman 1998; Raphael and Winter-Ebmer 2001). Similarly, the number of rainy days is included on the basis that good or bad weather may have a direct impact on both crime and mental wellbeing (see eg. Cohn 1990; Jacob, Lefgren, and Moretti 2007). Both these variables are measured over the same period as the crime rate (for example, in specifications where we look at the effect of crime in the previous month, we also control for the unemployment rate and the share of rainy days in the previous month)<sup>16</sup>.

### 3. Empirical Methodology

#### 3.A Victims of Crime

We now explain briefly our estimation strategy. We first estimate the relationship between mental well-being, and becoming a victim of crime. This – besides being informative in its own right – will help us to benchmark our results for non-victims. Our estimation equation is given by

$$(1) M_{it} = b_0 + b_1 V_{it} + b_2 S_{rt} + b_3 X_{it} + T_t + R_r + \lambda_i + \varepsilon_{it}$$

where  $M_{it}$  is the mental distress index of individual  $i$  in area  $r$  at interview date  $t$ ,  $S_{rt}$  are time-varying regional characteristics,  $X_{it}$  are time-varying individual characteristics, and the terms  $T_t$  and  $R_r$  represent time fixed effects and area fixed effects. Further,  $\lambda_i$  is an individual specific effect and  $\varepsilon_{it}$  an *iid* residual term. The variable  $V_{it}$  is an indicator variable, being equal to 1 if individual  $i$  has been a victim of a crime during the year prior to the interview. Our data allows us to distinguish between property crime and violent crime.

In a simple cross-section, estimates of  $b_1$  are likely to be biased, even if we condition on region fixed effect, as individuals who are more likely to be victims

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<sup>16</sup> Appendix 3 discusses these variables in more detail.

of crime may at the same time be experiencing lower mental well-being, leading to a correlation between  $V_{it}$  and  $\lambda_i$ . Our repeated information on mental well-being, as well as victimization status, allows us to condition on fixed individual effects  $\lambda_i$ . We report results from estimations conditional and unconditional on fixed individual effects.

### 3.B Non Victims

Our main interest is about estimating the relationship between crime and mental wellbeing for non victims. We estimate a model of the following kind:

$$(2) M_{itr} = a_0 + a_1 C_{tr} + a_2 S_{rt} + a_3 X_{it} + T_t + R_r + \eta_i + u_{it}.$$

Here  $M_{itr}$  is a measure of mental well-being of individual  $i$  who lives in area  $r$  at interview date  $t$ ,  $S_{rt}$  are time-varying regional characteristics, and  $X_{it}$  are time-varying individual characteristics. The variable  $C_{tr}$  is the crime rate (we will distinguish between different types of crime) in the area of residence  $r$  in period  $t$  in the 12 months up to the interview date. The terms  $T_t$  and  $R_r$  represent time fixed effects and area effects. Finally,  $\eta_i$  is an individual specific effect, and  $u_{it}$  a residual term.

A simple cross-section does not allow us to condition on region- or individual fixed effects. This may seriously bias results, as sorting of individuals according to their mental well-being may be correlated with area characteristics, like crime rates. Conditioning on individual fixed effects will eliminate the sorting bias that is due to this sorting mechanism. However, it will only eliminate the region specific effects if there are no movers in the sample. Conditioning on both individual- and region fixed effects eliminates the sorting problem, and leads to consistent estimates under the two assumptions: strict exogeneity of the area crime rates, and selection of movers operating only through individual fixed effects, conditional on area crime rates and other region- and individual characteristics. The first assumption seems reasonable in our context, as a shock

to *individual* mental health in any one period is unlikely to affect area crime in other periods. The second assumption implies that individuals may differ in their propensities to move across areas (i.e. there are individual-specific terms in the equation that determines movements), but moving decisions made as responses to time-varying shocks are not correlated with individual mental well-being, conditional on individual characteristics and individual fixed effects, and area crime rates. Note again that area choices are allowed to depend on area crime rates.

One simple way to check that assumption is to regress the residual from a difference equation of mental health status on crime on the residual of moving area on past crime. The estimated coefficient is positive, but not significant ( $p=0.5$ ). If instead the first regression is a level regression, the estimated coefficient is significant and negative, which suggests correlation due to unobservable fixed effects in the moving- as well as the mental health equation.

When we estimate our model, we assign to individuals who move within the observation period a new individual fixed effect for each area to which they move, i.e. to condition on individual-area fixed effects. instead of conditioning on both area- and individual fixed effects.<sup>17</sup> Thus, in each region, our sample is restricted to “stayers”.

## **4. Results**

### **4A. The Effect of Crime on the Victims of Crime**

We first estimate equation (1), to determine the impact that becoming a victim of crime has on individuals’ mental well-being. We report our results in Table 4.

In the first panel (Panel A) we report results from OLS estimation that do not condition on individual fixed effects, but we include individual characteristics, as well as time dummies, area characteristics and area fixed effects. The first column reports results on the overall mental health measure

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<sup>17</sup> Results taking this approach, or conditioning on both individual- and area effects, lead to practically identical estimates.

(Mental Component Summary measure – MCS), while columns 2-5 report results on Social Functioning, Vitality, Role Emotional and Mental Health respectively. In the table, we report only coefficients on the crime variables.<sup>18</sup>

The estimates show that victimisation is strongly and significantly related to a deterioration of mental well-being, for all mental categories we consider here. The overall effects seem to be mainly driven by violent crime: for instance, to have been a victim of a violent crime is associated with a mental health outcome (measured by the Mental Component Summary Measure – MCS) that is about 7 percentage points (or 14.5 percent) lower. The associations with “social functioning” and “role emotional” are much larger. These results are in line with the psychological literature, where – based on surveys – a strong link between victimisation, and mental health problems is found (see for instance Kilpatrick et al. 1985). However, these associations may not be causal, as – as we discuss above – victims of crime may be a selected subgroup, with larger mental health issues.

In the next panel (Panel B, Table 4) we report results where we condition in addition on individual specific effects. This should eliminate the bias induced by individuals with lower mental wellbeing being more frequently victims of crime. The magnitude of the estimated coefficients drops quite dramatically, suggesting that the effects we find in OLS estimates are biased towards a larger impact of crime on mental wellbeing of victims, due to those individuals who are more likely to be victims of crime being at the same time more vulnerable in terms of their mental well-being. For instance, the effect of having been a victim of a violent crime on mental health (measured by the Mental Component Summary Measure – MCS) drops from about 7 percentage points to about 2 percentage points. Still, the effects are sizeable and in most cases statistically significant. Again, being a victim of a violent crime has a far larger effect of all measures of mental well being than being a victim of a property crime<sup>19</sup>. Effects are largest for “social functioning” and “role emotional” where the reduction is 6 percentage points (or about 7 percent).

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<sup>18</sup> Full set of estimates is in Appendix tables 4A and 4B.

<sup>19</sup> Moreover, Frijters, Johnston and Schields (2008) analyze the relationship between property crime and life satisfaction and show that individuals fully adapt to this negative life event within two years.

These results are in line with the psychological literature on the impact of victimization on mental wellbeing of victims. According to this literature the largest impact of victimization on mental health is on the emotional sphere (Kilpatrick and Acierno, 2003). Victims of violence experience a variety of emotional problems including foremost Post Traumatic Stress Disorder (PTSD), but also depression, panic, and substance abuse are prevalent among victims – which is to some extent reflected by the large coefficient on the variable “Role Emotional”. Among the symptoms of PTSD is the tendency of victims towards avoidance. This may be in the form of behavioural or cognitive escape from thoughts, feelings, individuals, or places associated with the trauma, as well as the experience of feelings of detachment, and restricted affect. This tendency towards increased avoidance is in our data represented by the large and significantly negative coefficient of the mental health scale “social functioning”. This scale tells us in fact how well the victim can perform normal social activities without interference due to physical or emotional problems.<sup>20</sup>

Overall, we conclude from these results that falling victim to a crime has a negative and sizeable impact on the individual’s wellbeing. This is particularly the case for violent crime.

#### **4.B The Effects of Area Crime on non-Victims**

We now turn to our main results, the effects of area crime on those who are not direct victims of crime. Our data is unique as it identifies victims of crime, which allows us to isolate the effect of the level of crime in the area where individuals live on mental well-being of non-victims. We report our main results in Table 5.

In the Table, we report results using the transformation we explain in section 3, where we condition on individual effects by region of residence. This transformation eliminates both region and individual effects, and addresses

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<sup>20</sup> See Table 2.

sorting bias, due to individuals selecting into high and low crime areas, according to their mental well-being, or high crime areas providing higher quality of counselling services and neighbourhood support facilities. In all results, standard errors are clustered on the area level. We have normalised all crime variables to have mean zero and unit standard deviations, so that the coefficient estimates can be interpreted as the impact of a one standard deviation change in the respective crime rate on the respective measure of well-being, which is standardised on a scale between 0 and 100.

The first column reports results where we condition on the total crime rates, while the second and third columns distinguish between property and violent crimes<sup>21</sup>. Most mental well-being indicators are negatively associated with total crime rates, though not significantly so. This is the same for property crime, where the coefficient estimates – though mostly negative – are small, and have large standard errors. However, coefficients are much larger, and more precisely estimates for violent crimes. Violent crime in the area leads to serious deterioration of mental well-being of residents, and the magnitude of these effects is quite sizeable, in particular if benchmarked against those of victims of crime. For instance, an increase in violent area crime by one standard deviation decreases mental well-being of non-victims by about 1.3 percentage points, or 2.6 percent. For “social functioning” and “role emotional”, the effect is – as for victims – largest (although insignificant for “role emotional”). In terms of magnitude, a one standard deviation increase in violent crime reduces “social functioning” by 2.9 percentage points, which is nearly half the effect victimisation has on the social well-being of victims.

These results suggest that mental wellbeing of non-victims of crime is significantly affected by violent crime in the area of residency. In line with this, contributions in the psychological literature have stressed the important role played by the perception of the level of violence in the neighbourhood on mental health of residents<sup>22</sup>. The sociological literature has stressed that to understand the effect of fear of crime on anxiety it is not enough to know *who* individuals are

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<sup>21</sup> In appendix table 5 we report the full set of estimates for non victims.

<sup>22</sup> For instance Whitley and Price (2005) examine the relationship between fear of crime and mental health in the Gospel Oak neighbourhood (London, UK) by conducting a qualitative case study of over a 2-year period.



(looking at observable characteristics of the individuals), but that more important than this it is to look at *where* they live (Pain, 2000; Smith, 1987).

#### **4C. Distinguishing crime categories**

Above we consider crime grouped in two broad categories only: violent and property crime. Our crime data allows us to distinguish between finer categories of crime, within these two broad groups. Table 6 presents the results of the impact of a breakdown of violent and property crime on mental wellbeing. We distinguish among violent crimes between homicide, assault, sexual assault, abduction and robbery. We split up property crimes into burglary and theft. Panel A reports the results for violent crime, and Panel B the results for property crime. We only report results where we condition on area- and individual fixed effects, corresponding to the specification in Panel B in Table 5. In both panels columns 1-5 refer to the five mental health wellbeing scales. We also report in the first column the percentage of the overall crime category the respective type of crime accounts for.

The breakdown of property crime in two distinct components does not change our overall conclusion: as before, property crime does not seem to affect the mental well-being of non-victims in a significant way, even if we break it down in different categories. For violent crime, on the other hand, there seems to be a more distinct pattern. It is assault, sexual assault and robbery that affect most categories of mental well-being. Particularly sexual assaults – although constituting a fairly small category of overall crimes – have a sizeable and significant effect on three of the five measures of mental well-being.

#### **4 D. Area Crime and Media Coverage**

Changes in area crime can only affect individuals' distress if individuals know about it. In a recent study Strafford Chandola and Marmot (2007) have shown that there is a strong link between fear of crime and poorer mental health,

and that this is irrespective of the reported levels of crime. An important role in determining fear is potentially played by press coverage of crime (Box Hale and Andrews, 1988).

The role of media may not have always have been as important as it is today. According to Garland (2001) in the last few decades crime moved from being a problem for the poor to being a problem that affects the daily life of a larger group of individuals. In his analysis he stresses the role played by mass media in raising the importance of crime, 'institutionalizing' public concern, and bringing crime and its perceived risk into everyday lives. Despite a wide literature on the effect of media coverage of crime on fear (e.g. the 'Mean World Syndrome' developed by George Gerbner, can be profitably applied to crime<sup>23</sup>) and risk research (Jackson, 2006), there is to our knowledge no economic study trying to assess the importance of this effect. In this section we will ask the question to what extent media coverage contributes to the way mental wellbeing is affected by area crime.

We have collected data on media mentions of both violent (e.g. murder, homicide, etc.) and property crimes (e.g. theft, stealing, etc) in local newspapers in Australia. To do so we have made use of the largest database of media mentions in Australia owned by Media Monitors<sup>24</sup>. In Appendix 6 we describe in detail the methodology and the search criteria we have used for collecting the data on media mentions. On average, over the period 2001-2006 we observe every year around 600 media mention for violent crime on local papers, and 230 media mentions for property crime.

To measure the effect media coverage has on individual well-being, we estimate the same regressions than above (Table 5), but we add two terms. First,

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<sup>23</sup> According to the 'Mean World Syndrome' the violence-related content of mass media projects to the viewers an image of the world that is more dangerous than it actually is, and prompts therefore individuals to fear and a desire for more protection than actually needed (Gerbner et al, 1986).

<sup>24</sup> The Media Monitors database limits us in both geography (some residents in our sample are not covered by a newspaper that is archived by Media Monitors - MM) and time (for some local newspapers, Media Monitors began archiving them part-way through our sample period). To the extent that these biases are non-random, we would expect areas with MM newspapers to be more urban and to have a stronger sense of local community. The first bias would most likely be correlated with higher crime rates, the second with lower crime rates. Given that we only consider metropolitan areas in the subsample for which we have media information we observe lower crime rates than in the overall sample used in the rest of the paper.

we add the media coverage of crime in the year prior to the interview, and secondly we add the interaction of area crime with media coverage.

There are several channels by which newspaper coverage may lead to an increase of the effects of changes in area crime on mental well-being. First, intensive coverage may have a “multiplier” role, in two dimensions. First, by creating the impression that a given crime incident is more serious than otherwise felt. Secondly, by informing a larger part of the population about the crime incidence. Both should be reflected in our data by a positive interaction between media coverage, and area crime. However, there is a third channel by which media coverage affects mental health distress. Our crime data do not distinguish between the “seriousness” of crime incidences. If media coverage intensity is positively correlated with the seriousness of crime incidents in the area, then this may simply pick up a “quality” effect of crime.

We report our results in Tables 7a and 7b. Table 7a refers to violent crime and personal crime media coverage. Table 7b reports the results for property crime and property crime media coverage. Both tables have the following structure: in the first panel (Panel A), we report results when we condition solely on crime coverage in local newspapers, unconditional on area crime. In the second panel (Panel B), we report results where we estimate our full specification, which includes area crime measures and the interaction of these with local media coverage.

The interaction between local media and violent crime seems to be very important - which suggests that media reporting has a kind of “multiplier effect” on the way crime affects mental well-being. The interaction term is in fact negative and significant when considering the mental component summary measure, social functioning, vitality and mental health indexes. In particular we observe the largest ‘multiplicative effect’ of media coverage on the ‘social functioning’ scale – a one standard deviation increase in crime reduces mental wellbeing measured by the ‘social functioning’ index but almost three further percentage points. We do not find on the other hand a similar effect of media coverage on mental wellbeing for property crime (table 7b).

#### 4E. Heterogeneous Responses

We have estimated a number of additional regressions. We first address the question whether responses to area crime differ across individuals with different demographic characteristics. For instance, is the mental well-being of older individuals more affected by changes in crime rates in the area? Or are individuals with children in a vulnerable age range more affected? In the criminology literature, the issue of whether there is a significant relationship between gender and age and fear of crime is much debated. Pain (2001), in a review of the literature, notes that the relations between fear of crime and characteristics like age and gender are very complex and that no clear cut answers have been found in the literature to date on whether certain sub-groups of the population, most notably women and older people, experience more fear of crime than others. We investigate these issues in this section. We estimate specification as in Table 5, where we add – in addition – interaction terms between individual characteristics and the crime rate in the area (using education and age). In Table 8, we report these results. Panel A refers to violent crime, and panel B to property crime. As the results indicate there is no systematic pattern in the data.

Although research on fear of crime has mainly focused on personal fear, a few papers have also looked into the fact that people not only fear for themselves but also for other individuals that are dear to them - eg children and spouses (Warr and Ellison, 2000; Tulloch, 2004). There are reasons to believe that fear for other persons ('altruistic fear') may be at least as important as personal fear (parental love may for instance induce a parent to adopt measures for protecting his/her children that he/she would not adopt for him/herself)<sup>25</sup>. According to this literature, fear of crime should be seen as an emotional reaction to danger threatening either themselves and/or others dear to the individual. To

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<sup>25</sup> Studies on car safety devices have shown that parents tend to use for instance seatbelts more (for themselves and for their children) than individuals that do not have children (see for instance Blomquist Miller and Levy, 1996).

investigate this in our data we look at families with children. We group children in three categories according to their age (0-4, 5-14 and 15-24 years of age), and we distinguish children by gender. We report these results in table 9.

As before, most interaction are insignificant. If anything, it appears from the point estimates that families with children aged between 5 and 15 that are more sensitive to crime levels in the area, which is in line with findings from the social psychiatry literature. Whitley and Prince (2005) have collected data over a two years period with the aim of comparing the impact of fear of crime across sub-groups on mental health. The sub-group of the population that most felt the impact of fear on crime in terms of worsened mental wellbeing were mothers of young children.

## **5. Discussion and Conclusion**

In this paper we investigate the effects area crime may have on non-victims of crime. As we discuss in the Introduction, the difference between direct victimization costs and willingness to pay to reduce crime suggests that perhaps most of the social cost of crime is suffered by non-victims. If that is the case, then the cost of crime may be far larger than commonly suggested by methods that evaluate the effects on victims and their immediate family.

In this paper, we combine detailed crime statistics with panel survey data that provides a detailed set of mental well-being indicators for the same individuals over a six-year period. This allows us to address the sorting problem, where individuals with mental distress symptoms are at the same time more likely to react more strongly to crime, or to live in areas with higher crime rates.

We start with investigating the impact crime has on the mental well-being of victims. We find a strong relationship between victimization and mental wellbeing for both property- and violent crimes. Conditioning on individual fixed effects considerably reduced this coefficient, suggesting that sorting is indeed a problem in straightforward regressions. Nevertheless, we still find considerable

and effects on all mental well-being measures, predominantly driven by being a victim of a violent crime.

Turning to non-victims, we find significant, and quite sizeable effects of violent crime on the mental well-being of non-victims, conditional on individual-specific effects. Point estimates for property crime are smaller, and not statistically significant. Distinguishing between different crime categories, it appears that these effects are driven by incidences of assaults, including sexual assault, and robbery. Thus, these results provide first evidence for the hypothesis that the costs of crime through reducing the well-being of non-victims may be substantial.

We also investigate the role reporting in the local media has on mental well-being, by interacting the intensity of reporting with crime rates. We find that the intensity of reporting increases the negative effect on mental well-being, suggesting that media reporting plays an important role in enhancing the negative effect area crime has on non-victims.

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## **Appendices**

### ***A1. Crime Statistics***

In Australia, the collation of crime statistics is a state government responsibility. Although some data are routinely provided to the Australian Institute of Criminology, this does not include the high-frequency, regionally disaggregated data that we use in this paper.

After repeated contact with the governments of the six states and two territories that comprise Australia, we were able to obtain crime statistics data for all areas except the Northern Territory. In some cases, this contact also included lodging Freedom of Information requests, though ultimately none of the data were provided through this channel. Only Victoria required us to pay for the data – the other states provided it free of charge. Since only 0.9 percent of Australians live in the Northern Territory, our crime data theoretically covers 99.1 percent of the Australian population. We are also unable to match data for a small number of observations in our dataset, so end up with crime data for 98.7 percent of our survey sample.

In the Australian Capital Territory, New South Wales, Queensland, South Australia, and Victoria, crime data are coded by police stations on a Local Government Area (LGA) basis (the Australian Capital Territory is a single LGA). In Tasmania, crime data are coded on a suburb basis, and matched to postcodes using a crosswalk supplied by the Australian Bureau of Statistics. In Western Australia, crime data are coded on by locality, and we match them to postcodes using a crosswalk supplied by the Western Australian Police. Both suburbs (Tasmania) and localities (Western Australia) are a finer geographic coding than postcodes.

In the case of Victoria, the data was confidentialized, such that cells containing between 1 and 3 crimes were replaced with an asterisk. In addition, the statistics contained data on the total number of crimes (across all categories)

for each month. Using these totals, we imputed values for the confidentialized cells using the following procedure:

- If the total was confidentialized, assume the total was 2
- Calculate the gap between the total and the sum of the non-confidentialized cells
- Divide this gap by the number of confidentialized cells, and assign that number to each of the confidentialized cells.

For all states and territories except the Australian Capital Territory, crime statistics are reported on a monthly basis. For the Australian Capital Territory, data are tabulated on a quarterly basis, and we assign the same crime rate to each month in the quarter. Criminal incidents are classified by the date that they were reported to or detected by police. We expect that in most cases this will correspond to the date on which the offence occurred, but we have no way of verifying this.

Population data are drawn from the Australian Bureau of Statistics publication *Regional Population Growth* (Cat No 3218.0). This provides the population for each LGA as at June in each year. We linearly interpolate population figures for intervening months. In a small number of cases, the ABS does not report population statistics for an LGA, but we still have crime statistics for that area. In these instances, we assume the population is unchanged from the closest date for which we have population statistics. (In other words, we do not extrapolate beyond the available population data.) Queensland underwent a major council amalgamation in 2007-08. Although our crime statistics for Queensland are tabulated on the new LGA boundaries, the population data is available only for old LGAs. We therefore combine the population of the old LGAs in order to form the appropriate denominator.

The states do not apply a uniform crime classification system. The number of different crime categories in which the data were provided was 16 for the Australian Capital Territory, 60 for New South Wales, 87 for Queensland, 119

for South Australia, 206 for Tasmania, 27 for Victoria, and 24 for Western Australia. We recoded crimes into 16 categories using the Australian Standard Offence Classification (ASOC). These categories are described in Appendix Table 1.

### ***A2. Mental Wellbeing – The SF-36 Health Survey Questions***

The HILDA Survey has information of mental wellbeing for all waves. In particular mental wellbeing is measured with the SF-36 questionnaire. In Appendix table 2 we report the questions asked in the SF-36 survey.

These 36 items are used to construct eight scales that aggregate from 2 to 10 items each. Appendix Table 3 summarizes how the survey items are grouped to construct the four mental health scales and the mental health summary measure that we use in the analysis. In particular, column (1) of Appendix Table 3 reports the different survey questions (14 of the 36 survey items are used to construct the mental health items), column (2) the mental health scales (Vitality, Social Functioning, Role Emotional and Mental Health) and column (3) reports the Mental Health Summary Measure (MCS) that aggregates the scales. Each item is used in scoring only one scale.

Questions 9a, 9e, 9g and 9i are used to construct the *vitality measure* (a. Did you feel full of pep?; e. Did you have a lot of energy?; g. Did you feel worn out?; i. Did you feel tired?); questions 6 (“During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?”) and 10 (“During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities?”) are used to construct the *social functioning measure*; questions 5a, 5b and 5c (“During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems? a. Cut down on the amount of time you spent on work or other activities; b. Accomplished less than you would like; c. Did work or other activities less carefully than usual) are used to construct the *role emotional measure*; questions 9b, 9c, 9d, 9f and 9h (“How

much of the time during the past 4 weeks... b. Have you been a very nervous person?; c. Have you felt so down in the dumps that nothing could cheer you up?; d. Have you felt calm and peaceful?; f. Have you felt downhearted and blue?; h. Have you been a happy person?) form the *mental health measure*.

### ***A3. Unemployment and Rain Days***

Unemployment statistics are produced on a quarterly basis for each Statistical Local Area (SLA) by the Department of Employment and Workplace Relations. This is the finest level of aggregation at which we are able to obtain unemployment rate data. These estimates are based on data from the monthly Labour Force Survey conducted by the Australian Bureau of Statistics, adjusted using Centrelink data on the number of Newstart and Youth Allowance (Other) recipients and Census data. The Department of Employment and Workplace Relations have smoothed these data by averaging over four quarters.

The unemployment rate is not available for all SLAs. Where it is available in some later months, but not earlier months, we use the later months to estimate the ratio of unemployment in that SLA to the national unemployment rate, and multiply the national unemployment rate by this ratio to impute missing values for earlier months. Where the unemployment rate is missing in all quarters, we assign the national unemployment rate. In some cases, unemployment rates are based on labor force estimates of less than 100 people. In these cases, we assume that measurement error renders them unusable, and instead assign the unemployment rate of the nearest SLA.

There are 932 SLAs in Australia (in many cases SLAs cover the same area as LGAs). We match each respondent to his or her SLA using a crosswalk prepared by the ABS. This crosswalk does not contain information on the proportion of the population in each postcode area who live in the SLA.

Using daily data provided by the Bureau of Meteorology, and taken from weather stations in the capital cities, we calculate the share of rain days in a given month. For example, if some rainfall was recorded on 10 days in a 30-day



month, the share of rain days would be 0.33. We then calculate the share of rain days over the previous year.

#### ***A4. Victims***

In tables 4A and 4B we report the full set of estimates of the effect of crime on the mental wellbeing of victims, OLS and FE respectively.

#### ***A5. Non Victims***

In table 5 we report the full set of FE estimates of the effect of crime on the mental wellbeing of non victims.

#### ***A6. Media Reports***

Data on media mentions were obtained by carrying out media searches of local newspapers. This was done through Media Monitors, the firm with the largest database of media mentions in Australia.

For this purpose, we identified the following 90 local newspapers: Albert & Logan News, Bayside Leader, Bendigo Advertiser (Bendigo), Berwick/Pakenham Cardinia Leader, Blacktown Advocate, Border Mail (Albury Wodonga), Brimbank Leader, Caboolture Shire Herald, Cairns Sun, Caulfield Glen Eira/Port Philip Leader, Central Coast Express, Central Coast Herald, Centralian Advocate, City South News, Cranbourne Leader, Daily News (South Tweed Heads), Daily News (Warwick), Diamond Valley Leader, East Torrens Messenger, Eastern Courier Messenger, Geelong Advertiser, Geelong News, Gold Coast Sun, Guardian Messenger, Heidelberg Leader, Herbert River Express, Hills & Valley Messenger, Hills Shire Times, Home Hill Observer, Hume/Moreland Leader, Illawarra Mercury (Wollongong, Australia), Innisfail Advocate, Kalgoorlie Miner, Knox Leader, Lake Macquarie News, Leader Messenger, Lilydale & Yarra Valley Leader, Logan West Leader, Macarthur Chronicle, Manningham Leader, Maroondah Leader, Melbourne/Yarra Leader, Melton/Moorabool Leader, Moonee Valley Leader, Moorabbin Glen Eira/Kingston Leader, Mordialloc Chelsea Leader, Moreland Leader, Mornington Peninsula Leader, Mosman & Lower North Shore Daily, Mt Druitt/St Marys Standard, North Shore Times,

North West News, Northcote Leader, Northern District Times, Northern Times, Northside Chronicle, Oakleigh Monash/Springvale Dandenong Leader, Parramatta Advertiser, Penrith Press, Pine Rivers Press, Port Douglas & Mossman Gazette, Portside Messenger, Preston Leader, Progress Leader, Redcliffe Bayside Herald, South East Advertiser, South West News, Southern Star, Standard Messenger, Stonnington Leader, Sunbury/Macedon Ranges Leader, Tablelands Advertiser, Tasmanian Country, The Cairns Post, The Chronicle (Canberra), The City Messenger, The Countryman, The Echo (Victoria, Australia), The Glebe, The Gold Coast Bulletin, The Newcastle Herald (New South Wales, Australia), The Tablelander, The Weekly Times, Townsville Bulletin, Townsville Sun, Waverley Leader, Westside News, Whitehorse Leader, Whittlesea Leader, Wynnum Herald.

Due to cost constraints, it was necessary to carry out each search on an annual basis. We therefore chose the period that corresponded most closely to the year prior to a HILDA interview. HILDA interviews commence in August or September, and over 90 percent of respondents have been surveyed by the end of November. We therefore searched each newspaper over the period from 1 December to 30 November. These data were then matched to the corresponding HILDA interview. For example, newspaper media mentions for 1 December 2000 to 30 November 2001 were matched to HILDA interviews commencing in August 2001 (the vast majority of which had been completed by 30 November 2001).

To match each HILDA respondents to a local newspaper, we used the website <http://www.newsspace.com.au/>, which contains detailed suburb coverage maps for each local newspaper in Australia. In cases where the same postcode was served by multiple local newspapers, we assigned the respondent the newspaper with the highest coverage rate across that postcode.

Media monitors searches aimed at picking up crime-related stories in two categories: personal crime, and property crime. Due to cost limitations (the searches could not be automated, so had to be entered by hand), we carried out a single search in each category. The searches were:

Search 1 - Personal crimes: murder\* OR manslaughter OR kill\* OR homicide OR assault OR stab\* OR strangle\* OR "domestic violence" OR "sexual assault" OR rape OR rapist OR abduct\* OR kidnap\* OR mugging OR violen\*

Search 2 - Property crimes: burgl\* OR "break and enter" OR larceny OR theft OR steal\* OR stolen OR thief OR thieves OR shoplift\*

**Table 1 - Crime Trend per 100,000 population  
(2001-2006)**

	(1) Property crime	(2) Violent crime	(3) Total crime
2001	7805	982	8787
Std. Dev.	(5195)	(844)	(5957)
2002	7333	980	8313
Std. Dev.	(5310)	(841)	(6053)
2003	6680	982	7662
Std. Dev.	(4857)	(848)	(5587)
2004	5794	928	6722
Std. Dev.	(3868)	(751)	(4523)
2005	5156	949	6105
Std. Dev.	(3187)	(693)	(3781)
2006	4982	969	5950
Std. Dev.	(3078)	(778)	(3768)
Total	6323	965	7289
Std. Dev.	(4498)	(796)	(5176)

Note: The table shows the trend (2001-2006) in yearly average property crime, violent crime and total crime (columns (1), (2) and (3)) per 100,000 individuals in Australian metropolitan areas. Standard deviations across LGA are in brackets.

**Table 2: Definitions of lowest and highest possible scores of the SF-36's mental health scales, and descriptives**

	(1) Lowest possible (min=0)	(2) Highest possible (max=100)	(3) Mean	(4) Std. Dev.
Vitality	Feels tired and worn out all of the time.	Feels full of pep and energy all of the time.	60.46	19.58
Social Functioning	Extreme and frequent interference with normal social activities due to physical or emotional problems.	Performs normal social activities without interference due to physical or emotional problems.	82.15	23.44
Role Emotional	Problems with work or other daily activities as a result of emotional problems.	No problems with work or other daily activities as a result of emotional problems.	82.79	32.72
Mental Health	Feelings of nervousness and depression all of the time.	Feels peaceful, happy, and calm all of the time.	73.70	17.12

Note: definitions of the lowest and highest possible scores (columns 1 and 2) are from the Sf-36 website (<http://www.sf-36.org/>). Descriptives (columns 3 and 4) refer to the HILDA dataset (2001-2006), metropolitan areas only.

**Table 3 - Descriptives of our sample and Mental Health Scores**

	(1)	(2)	(3)	(4)	(5)
	All sample	non victims	victims of any crime	victims of property crime	victims of violent crime
<b>Panel A - Descriptives</b>					
Age	43.1	43.5	37.2	38.6	31.8
N	34978	32348	2630	21z32	628
Male	47%	46%	50%	50%	49%
Education Low	48.8%	49.0%	47.0%	44.5%	59.0%
Education Medium	26.3%	26.3%	27.4%	28.0%	24.8%
Education High	24.8%	24.8%	25.7%	27.5%	16.2%
N	34761	32140	2621	2127	624
Mover	7.4%	7.0%	12.4%	11.6%	16.6%
N	33367	30945	2422	1970	561
Children age 0-4	12.0%	12.0%	12.9%	12.9%	11.1%
Children age 5-14	19.5%	19.7%	17.4%	19.0%	10.8%
Children age 15-24	14.1%	14.3%	10.8%	11.2%	8.9%
N	34978	32348	2630	2132	628
<b>Panel B - Mental Health</b>					
Vitality	60.5	60.8	56.8	58.1	50.6
	(19.6)	(19.4)	(20.4)	(19.7)	(22.3)
Social Functioning	82.1	82.9	76.9	79.2	64.8
	(23.4)	(22.9)	(26.0)	(24.7)	(29.1)
Role Emotional	82.8	83.8	75.8	78.4	62.0
	(32.7)	(31.9)	(37.2)	(35.5)	(42.6)
Mental Health	73.7	74.2	69.7	71.6	61.1
	(17.1)	(16.8)	(18.9)	(17.7)	(21.6)
MCS	48.5	48.8	45.4	46.6	40.0
	(10.3)	(10.1)	(11.9)	(11.2)	(13.7)

Note: Urban areas only. Education is the highest level of education achieved. Low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is a bachelor to a doctorate. Move is whether the individual moves Lga within the year. We also include three variables indicating whether there are children in the household and of what age group (0-4, 5-14 or 15-24 years old). We also account for two other time-varying characteristics known to affect mental wellbeing: the local area unemployment rate, and the share of rainy days. Both these variables are measured over the same period as the crime rate. Column (2) refers non victims, and column (3) to victims of any crime - property or violent (7% of the sample population). Columns (4) & (5) distinguish between victims of violent and victims of property crime. Standard deviations in parenthesis.

**Table 4: The Impact of having been a victim of crime on wellbeing  
(victim in the year before the interview date)**

	(1)	(2)	(3)	(4)	(5)
	<i>MCS</i>	Social Functioning	Vitality	Role Emotional	Mental Health
<b>Panel A: OLS</b>					
<i>victim of any crime</i>	-2.75***	-6.01***	-4.20***	-8.12***	-3.63***
SE	(0.344)	(0.729)	(0.514)	(1.056)	(0.503)
N	29443	30661	30559	30041	30552
<i>victim of violent crime</i>	-7.07***	-17.41***	-9.41***	-20.67***	-10.19***
SE	(0.735)	(1.676)	(1.139)	(2.422)	(1.098)
N	29380	30589	30489	29974	30482
<i>victim of property crime</i>	-1.74***	-3.64***	-2.89***	-5.37***	-2.12***
SE	(0.330)	(0.666)	(0.579)	(0.990)	(0.502)
N	29421	30631	30533	30015	30525
<b>Panel B: FE</b>					
<i>victim of any crime</i>	-0.61**	-1.70***	-0.95**	-2.51**	-0.72*
SE	(0.273)	(0.558)	(0.416)	(0.976)	(0.436)
N	29443	30661	30559	30041	30552
<i>victim of violent crime</i>	-1.83***	-5.60***	-1.33	-5.88**	-2.73**
SE	(0.690)	(1.530)	(0.981)	(2.789)	(1.230)
N	29380	30589	30489	29974	30482
<i>victim of property crime</i>	-0.38	-0.94*	-0.76*	-2.01**	-0.36
SE	(0.248)	(0.549)	(0.432)	(0.930)	(0.394)
N	29421	30631	30533	30015	30525

Note: In Panel A we report results from OLS estimation that do not condition on individual fixed effects, but we include area and individual characteristics, as well as time and area dummies. Individual controls are a quadratic in age, three educational qualifications' dummies, and indicator variables for children aged 0-4, 5-14, and 15-24. Education is the highest level of education achieved. Low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is a bachelor to a doctorate. We also control for the number of rainy days and unemployment. In Panel B we report FE results. The analysis is for urban areas only. Robust standard errors in brackets. Coefficients with \* are statistically significant at the 10 percent level, those with \*\* at the 5 percent level, and those with \*\*\* at 1 percent level.

**Table 5: The Impact of Crime on mental wellbeing of Non Victims (FE)  
(crime in the year before the interview date)**

		(1) Total Crime	(2) Property Crime	(3) Violent Crime
<i>MCS</i>		-0.22	-0.11	-1.32 **
	<i>SE</i>	(0.330)	(0.317)	(0.509)
	N		27266	
Social Functioning		-0.40	-0.15	-2.92 **
	<i>SE</i>	(0.788)	(0.768)	(1.215)
	N		28408	
Vitality		-0.23	-0.10	-1.54 **
	<i>SE</i>	(0.501)	(0.494)	(0.726)
	N		28311	
Role Emotional		0.26	0.46	-2.57
	<i>SE</i>	(0.891)	(0.860)	(1.832)
	N		27835	
Mental Health		-0.27	-0.16	-1.27
	<i>SE</i>	(0.485)	(0.448)	(0.802)
	N		28305	

Note: Individual controls are a quadratic in age, three educational qualification dummies, and an indicator variables for children aged 0-4, 5-14, and 15-24. Education is the highest level of education achieved. Low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is a bachelor to a doctorate. We also control for the number of rainy days and unemployment. The analysis is for urban areas only. Robust standard errors in brackets. Coefficients with \* are statistically significant at the 10 percent level, those with \*\* at the 5 percent level, and those with \*\*\* at 1 percent level.



**Table 6: The Impact of Crime on Metal Wellbeing of Non Victims – Different Crimes (FE)**

	(1)	(2)	(3)	(4)	(5)
	MCS	Social Functioning	Vitality	Role Emotional	Mental Health
<b><u>Panel A:</u></b>					
<b><u>Violent Crime</u></b>					
Homicide (.5% of violent crime)	-0.06 (0.09)	-0.08 (0.22)	-0.06 (0.15)	-0.14 (0.36)	0.02 (0.15)
Assault (75.3% of violent crime)	-1.13 ** (0.52)	-1.82 (1.22)	-1.24 (0.80)	-2.23 (1.75)	-1.24 * (0.75)
Sexual Assault (14.3% of violent crime)	-0.25 (0.16)	-0.70 * (0.39)	-0.49** (0.23)	-1.08 * (0.62)	-0.21 (0.26)
Abduction (.9% of violent crime)	0.12 (0.12)	-0.07 (0.43)	-0.09 (0.25)	0.38 (0.33)	0.14 (0.16)
Robbery (8.5% of violent crime)	-0.53 * (0.32)	-1.83 *** (0.63)	-0.25 (0.57)	0.01 (0.93)	-0.36 (0.60)
<b><u>Panel B:</u></b>					
<b><u>Property Crime</u></b>					
Burglary (29.3% of property crime)	-0.11 (0.25)	0.28 (0.57)	-0.10 (0.42)	0.29 (0.85)	-0.31 (0.38)
Theft (70.7% of property crime)	-0.09 (0.34)	-0.36 (0.72)	-0.08 (0.51)	0.45 (0.83)	-0.05 (0.47)

Note: Individual controls are a quadratic in age, three educational qualification dummies, and an indicator variables for children aged 0-4, 5-14, and 15-24. Education is the highest level of education achieved. Low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is a bachelor to a doctorate. We also control for the number of rainy days and unemployment. The analysis is for urban areas only. Robust standard errors in brackets. Coefficients with \* are statistically significant at the 10 percent level, those with \*\* at the 5 percent level, and those with \*\*\* at 1 percent level.

**Table 7a: The Role of Media on Mental Wellbeing of Non Victims  
Violent Crime**

	(1)	(2)	(3)	(4)	(5)
	<i>MCS</i>	Social Functioning	Vitality	Role Emotional	Mental Health
<b><u>Panel A:</u></b>					
Personal media (mean=5.45; st dev=.87)	0.02	-1.00	0.28	0.10	-0.28
<i>SE</i>	(0.49)	(1.23)	(0.97)	(1.71)	(0.79)
<b><u>Panel B:</u></b>					
Violent crime	4.90	14.43**	9.11**	-4.11	8.21*
<i>SE</i>	(3.05)	(6.47)	(4.47)	(9.72)	(4.96)
Personal media	-0.06	-1.15	0.18	0.17	-0.41
<i>SE</i>	(0.51)	(1.26)	(0.97)	(1.69)	(0.83)
Violent crime * Personal media	-1.05*	-2.68**	-1.73**	0.88	-1.69**
<i>SE</i>	(0.58)	(1.25)	(0.81)	(1.70)	(0.96)
<i>N</i>	15478	16126	16067	15816	16062

Note: Media is local media coverage of personal crime (see appendix 7 for details). Crime is violent crime. FE estimation. Individual controls are a quadratic in age, three educational qualification dummies, and indicator variables for children aged 0-4, 5-14, and 15-24. Education is the highest level of education achieved. Low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is a bachelor to a doctorate. We also control for the number of rainy days and unemployment. The analysis is for urban areas only. Robust standard errors in brackets. Coefficients with \* are statistically significant at the 10 percent level, those with \*\* at the 5 percent level, and those with \*\*\* at 1 percent level.

**Table 7b: The Role of Media on Mental Wellbeing of Non Victims**

		<b>Property Crime</b>				
		(1)	(2)	(3)	(4)	(5)
		<i>MCS</i>	Social Functioning	Vitality	Role Emotional	Mental Health
<b><u>Panel A:</u></b>						
	Property media (mean=4.5; st dev=.63)	-0.34	-1.29	-0.69	1.51	-0.67
	<i>SE</i>	0.55	(1.51)	(1.07)	(1.86)	(1.01)
<b><u>Panel B:</u></b>						
	Property crime	1.63	8.75	6.66	0.93	2.07
	<i>SE</i>	(2.56)	(7.21)	(5.23)	(7.68)	(4.76)
	Property media	-0.43	-1.77	-1.03	1.49	-0.80
	<i>SE</i>	(0.61)	(1.54)	(0.98)	(1.94)	(1.04)
	Property crime * Property media	-0.37	-2.12	-1.30	-0.01	-0.47
	<i>SE</i>	(0.62)	(1.68)	(1.21)	(1.82)	(1.16)
	<i>N</i>	15478	16126	16067	15816	16062

Note: Media is local media coverage of property crime (see appendix 7 for details). Crime is property crime. FE estimation. Individual controls are a quadratic in age, three educational qualification dummies, and indicator variables for children aged 0-4, 5-14, and 15-24. Education is the highest level of education achieved. Low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is a bachelor to a doctorate. We also control for the number of rainy days and unemployment. The analysis is for urban areas only. Robust standard errors in brackets. Coefficients with \* are statistically significant at the 10 percent level, those with \*\* at the 5 percent level, and those with \*\*\* at 1 percent level.

**Table 8: Impact of Crime on mental wellbeing of Non Victims**

	(1)		(2)		(3)		(4)		(5)	
	MCS	Std. Err.	SF	Std. Err.	VT	Std. Err.	RE	Std. Err.	MH	Std. Err.
<b><u>Panel A: Violent Crime</u></b>										
crime	-1.77**	0.78	-3.03 *	1.66	-2.94**	1.11	-1.14	2.88	-2.57	1.18
crime * education high	0.58	0.95	0.11	2.02	1.72	1.23	-1.70	2.87	1.51	1.25
crime * education med	0.73	1.03	-0.47	2.41	2.75*	1.58	-3.94	3.14	2.62*	1.54
crime	-1.27**	0.63	-3.45*	1.77	-1.17	1.06	-1.40	2.34	-1.28	1.00
crime*age(36-55)	-0.00	0.60	0.51	1.95	-0.69	1.06	-2.01	1.86	0.15	1.08
crime * age(56-max)	-0.33	0.71	0.88	1.66	-0.45	1.43	-2.21	3.42	-0.35	1.39
<b><u>Panel B: Property Crime</u></b>										
crime	-0.61	0.38	-0.83	0.79	-0.78	0.67	-0.70	1.88	-1.18**	0.54
crime * education high	0.76	0.59	1.03	1.22	1.01	0.87	1.78	2.62	1.50**	0.66
crime * education med	0.48	0.73	0.05	1.61	1.04	1.20	0.23	2.70	1.71	1.08
crime	-0.32	0.38	-1.65	1.06	-0.18	0.84	-1.18	1.56	-0.45	0.56
crime*age(36-55)	0.07	0.41	1.36	1.24	-0.24	0.82	0.43	1.57	0.15	0.71
crime * age(56-max)	0.64	0.64	3.60**	1.30	0.54	1.02	5.35*	3.01	0.85	1.09

Note: FE estimations. Individual controls are a quadratic in age, three educational qualification dummies, and indicator variables for children aged 0-4, 5-14, and 15-24. Education is the highest level of education achieved. In particular, low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is a bachelor to a doctorate. We also control for the number of rainy days and unemployment. The analysis is for urban areas only. Coefficients with \* are statistically significant at the 10 percent level, and those with \*\* at the 5 percent level.

**Table 9: Impact of Crime on mental wellbeing of Non Victims (children - boys and girls)**

	(1)		(2)		(3)		(4)		(5)	
	MCS	Std. Err.	SF	Std. Err.	VT	Std. Err.	RE	Std. Err.	MH	Std. Err.
<b>Panel A: Violent Crime</b>										
crime	-1.26 **	(0.50)	-3.15 **	(1.24)	-1.44 **	(0.71)	-2.05	(1.90)	-1.26	(0.47)
crime* boys 0-4	-0.27	(0.99)	1.39	(2.25)	0.64	(1.49)	-0.29	(2.40)	0.00	(1.24)
crime * boys 5-14	0.40	(0.62)	0.27	(1.68)	-0.16	(1.13)	3.12	(2.15)	-0.01	(1.21)
crime * boys 15-24	0.11	(0.48)	1.60	(1.20)	0.87	(0.91)	-2.80	(2.50)	0.52	(0.84)
crime *girls 0-4	0.62	(0.70)	0.87	(2.22)	-0.58	(1.26)	-0.18	(2.14)	2.00	(1.20)
crime *girls 5-14	-1.09	(0.73)	-1.09	(1.35)	-1.27	(1.13)	-5.55 *	(2.97)	-1.16	(1.23)
crime * girls 15-24	-0.08	(0.67)	0.31	(1.38)	-0.20	(1.29)	1.13	(2.64)	-0.80	(0.99)
<b>Panel B: Property Crime</b>										
crime	-0.06	(0.31)	-0.15	(0.21)	0.04	(0.55)	0.84	(0.90)	-0.15	(0.78)
crime* boys 0-4	0.16	(0.77)	0.89	(1.89)	-1.14	(1.64)	1.50	(2.44)	0.34	(1.41)
crime * boys 5-14	0.85	(0.59)	1.98	(1.30)	-0.27	(0.25)	2.94	(2.34)	1.19	(1.13)
crime * boys 15-24	-0.40	(0.47)	-0.69	(1.30)	-0.68	(1.02)	-2.34	(2.20)	-0.88	(0.82)
crime *girls 0-4	0.54	(0.83)	1.36	(1.93)	-0.46	(1.51)	1.88	(2.31)	1.97	(1.17)
crime *girls 5-14	-1.06	(0.74)	-0.98	(1.58)	-0.58	(1.32)	-7.65 ***	(2.17)	-0.21	(1.07)
crime * girls 15-24	-0.18	(0.57)	-0.13	(1.30)	-0.80	(0.36)	-1.18	(2.41)	-0.44	(1.11)

Note: FE estimations. Individual controls are a quadratic in age, three educational qualification dummies, and an indicator variables for children aged 0-4, 5-14, and 15-24 (divided by boys and girls). Education is the highest level of education achieved. In particular, low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is a bachelor to a doctorate. We also control for the number of rainy days and unemployment. The analysis is for urban areas only. Coefficients with \* are statistically significant at the 10 percent level, those with \*\* at the 5 percent level, those with \*\*\* at the 1 percent level.

**Appendix Table 1: Major Crime Categories – Australian Standard Offence Classification**

	<i>(1)</i>	<i>(2)</i>
	Description	Examples
<b><u>Panel A:</u></b>		
<b>Violent crimes</b>		
1	Homicide	Homicide and related offences
2	Assault	murder, conspiracy to murder, manslaughter
3	Sexual Assault	Acts intended to cause injury
4	Dangerous Acts	Sexual assault and related offences
5	Abduction	Dangerous or negligent acts endangering persons
6	Robbery	Abduction and related offences
		Robbery, extortion and related offences
		murder, conspiracy to murder, manslaughter
		assault, aggravated assault
		aggravated sexual assault, sexual offences against a child
		dangerous or negligent driving, neglect of person under care
		abduction, kidnapping, deprivation of liberty
		robbery, blackmail
<b><u>Panel B:</u></b>		
<b>Property crimes</b>		
7	Burglary	Unlawful entry with intent/burglary, break and enter
8	Theft	Theft and related offences
9	Deception	Deception and related offences
10	Drug Offences	Illicit drug offences
11	Weapons Offences	Weapons and explosives offences
12	Property Damage	Property damage and environmental pollution
13	Public Order Offences	Public order offences
14	Traffic Offences	Road traffic and motor vehicle regulatory offences
15	Justice Offences	Offences against justice procedures, government security and government operations
16	Miscellaneous Offences	Miscellaneous offences
		burglary, break and enter
		theft of a motor vehicle, receiving stolen property
		credit card fraud, bribery, counterfeiting
		traffic in illicit drugs, possess illicit drug
		sell prohibited weapons, possess prohibited explosives
		graffiti, noise pollution
		trespass, offensive language, prostitution
		speeding, driving without a licence
		breach of parole, breach of domestic violence order
		defamation, threatening behavior, public health offences

Note: – Australian Standard Offence Classification. The full classification can be obtained from the Australian Bureau of Statistics website (<http://www.abs.gov.au/>): ASOC, ABS Cat. no. 1234.0. In our analysis we include 1, 2, 3, 5 and 6 in violent crime and 7 and 8 in property crime.

**Appendix Table 2: SF-36 Health Survey**

1. In general, would you say your health is:

- 1 Excellent
- 2 Very good
- 3 Good
- 4 Fair
- 5 Poor

2. Compared to one year ago, how would you rate your health in general now?

- 1 Much better now than one year ago
- 2 Somewhat better than one year ago
- 3 About the same as one year ago
- 4 Somewhat worse than one year ago
- 5 Much worse now than one year ago

3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

3a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

3b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

3c. Lifting or carrying groceries

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

3d. Climbing several flights of stairs

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

3e. Climbing one flight of stairs

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

3f. Bending, kneeling or stooping

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

3g. Walking more than a mile

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

3h. Walking half a mile

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

3i. Walking one hundred yards

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

3j. Bathing or dressing yourself

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

*Continued...*

**Appendix Table 2: SF-36 Health Survey – cont.**

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

4a. Cut down on the amount of time you spent on work or other activities

- 1 Yes
- 2 No

4b. Accomplished less than you would like

- 1 Yes
- 2 No

4c. Were limited in the kind of work or other activities

- 1 Yes
- 2 No

4d. Had difficulty performing the work or other activities (for example, it took extra effort

- 1 Yes
- 2 No

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

5.a Cut down on the amount of time you spent on work or other activities

- 1 Yes
- 2 No

5.b Accomplished less than you would like

- 1 Yes
- 2 No

5.c Didn't do work or other activities as carefully as usual

- 1 Yes
- 2 No

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours or groups?

- 1 Not at all
- 2 Slightly
- 3 Moderately
- 4 Quite a bit
- 5 Extremely

7. How much bodily pain have you had during the past 4 weeks?

- 1 None
- 2 Very mild
- 3 Mild
- 4 Moderate
- 5 Very mild
- 6 Severe
- 7 Very severe

*Continued...*



**Appendix Table 2: SF-36 Health Survey - cont.**

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8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

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- 1 Not at all
- 2 A little bit
- 3 Moderately
- 4 Quite a bit
- 5 Extremely

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...

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9.a Did you feel full of life?

- 1 All of the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

9.b Have you been a very nervous person?

- 1 All of the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

9.c Have you felt so down in the dumps that nothing could cheer you up?

- 1 All of the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

9.d Have you felt calm and peaceful?

- 1 All of the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

9.e Did you have a lot of energy?

- 1 All of the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

9.f Have you felt downhearted and low?

- 1 All of the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

*Continued...*

**Appendix Table 2: SF-36 Health Survey - cont.**

<p>9.g Did you feel worn out?</p> <p>1 All of the time</p> <p>2 Most of the time</p> <p>3 A good bit of the time</p> <p>4 Some of the time</p> <p>5 A little of the time</p> <p>6 None of the time</p>	<p>9.h Have you been a happy person?</p> <p>1 All of the time</p> <p>2 Most of the time</p> <p>3 A good bit of the time</p> <p>4 Some of the time</p> <p>5 A little of the time</p> <p>6 None of the time</p>
<p>9.i Did you feel tired?</p> <p>1 All of the time</p> <p>2 Most of the time</p> <p>3 A good bit of the time</p> <p>4 Some of the time</p> <p>5 A little of the time</p> <p>6 None of the time</p>	
<p>10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?</p> <hr style="border-top: 1px dashed black;"/> <p>1 All of the time</p> <p>2 Most of the time</p> <p>3 Some of the time</p> <p>4 A little of the time</p> <p>5 None of the time</p>	
<p>11. How TRUE or FALSE is each of the following statements to you?</p> <hr style="border-top: 1px dashed black;"/>	
<p>11.a I seem to get ill more easily than other people</p> <p>1 Definitely true</p> <p>2 Mostly true</p> <p>3 Don't know</p> <p>4 Mostly false</p> <p>5 Definitely false</p>	<p>11.b I am as healthy as anybody I know</p> <p>1 Definitely true</p> <p>2 Mostly true</p> <p>3 Don't know</p> <p>4 Mostly false</p> <p>5 Definitely false</p>
<p>11.c I expect my health to get worse</p> <p>1 Definitely true</p> <p>2 Mostly true</p> <p>3 Don't know</p> <p>4 Mostly false</p> <p>5 Definitely false</p>	<p>11.d My health is excellent</p> <p>1 Definitely true</p> <p>2 Mostly true</p> <p>3 Don't know</p> <p>4 Mostly false</p> <p>5 Definitely false</p>

Note: Information on the Sf-36 questionnaire can be obtained on the SF-36 website (<http://www.sf-36.org/>). The questionnaire can be obtained by numerous online sources, among these the following website <http://bodytechniques.com/downloads/Health%20Survey.pdf>

**Appendix Table 3: SF-36 Health Survey - Construction of Mental Health Scales and Summary Measure**

(1)	(2)	(3)
Item	Scale	Summary Measure
9.a Did you feel full of life?	Vitality	
9.e Did you have a lot of energy?		
9.g Did you feel worn out?		
9.i Did you feel tired?		
6. interference with normal social activities	Social Functioning	
10. social time		
5.a Cut down on the amount of time you spent on work or other activities	Role Emotional	Mental Health
5.b Accomplished less than you would like		
5.c Didn't do work or other activities as carefully as usual		
9.b Have you been a very nervous person?	Mental Health	
9.c Have you felt so down in the dumps that nothing could cheer you up?		
9.d Have you felt calm and peaceful?		
9.f Have you felt downhearted and low?		
9.h Have you been a happy person?		

Note: This table illustrates the taxonomy of items underlying the construction of the SF-36 mental health scales and mental health summary measure (source: the SF-36 webpage, in particular the construction of the scales and summary measure is at the following page <http://www.sf-36.org/tools/sf36.shtml#CONSTRUCT>). The taxonomy has three levels: (1) questionnaire's items; (2) four mental health scales that aggregate 2-5 items each; and, (3) a summary measure that aggregate the four mental health scales. The numbers/letters in front of the items correspond to the numbering in the SF-36 questionnaire.

**Appendix Table 4A: The Impact of having been a victim of crime on wellbeing - OLS  
(victim in the year before the interview date)**

	(1)	(2)	(3)	(4)	(5)
	MCS	Social Functioning	Vitality	Role Emotional	Mental Health
<b>Panel A:</b>					
<i>Victim of any crime</i>	-2.749***	-6.011***	-4.202***	-8.115***	-3.627***
SE	(0.344)	(0.729)	(0.514)	(1.056)	(0.503)
<i>Age</i>	0.009	0.199**	0.118	0.525***	-0.066
SE	(0.036)	(0.081)	(0.074)	(0.103)	(0.062)
<i>Age2</i>	0.001	-0.004***	-0.002***	-0.008***	0.001**
SE	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
<i>Education low</i>	-0.971***	-2.731***	-1.555***	-3.220***	-2.536***
SE	(0.249)	(0.611)	(0.449)	(0.793)	(0.427)
<i>Education medium</i>	-0.114	-1.808**	-0.478	-1.561	-0.292*
SE	(0.292)	(0.693)	(0.592)	(0.953)	(0.477)
<i>Children 0-4 years</i>	0.090	0.090	-2.491***	0.191	0.947**
SE	(0.235)	(0.457)	(0.474)	(0.583)	(0.407)
<i>Children 5-14 years</i>	-0.154	0.265	-0.841***	0.341	-0.062
SE	(0.145)	(0.289)	(0.308)	(0.337)	(0.248)
<i>Children 15-24 years</i>	-0.030	0.125	-0.501	0.492	0.074
SE	(0.171)	(0.441)	(0.355)	(0.618)	(0.316)
<i>Rain days</i>	0.356	1.632	-1.566	4.532	-3.519
SE	(2.151)	(4.884)	(3.862)	(6.487)	(3.544)
<i>Unemployment</i>	-0.094	-0.487**	-0.124	-0.411***	-0.170
SE	(0.067)	(0.163)	(0.140)	(0.154)	(0.123)
N	29443	30661	30559	30041	30552

Continued...

**Appendix Table 4A: The Impact of having been a victim of crime on wellbeing -  
OLS (victim in the year before the interview date) - cont.**

	(1)	(2)	(3)	(4)	(5)
	<i>MCS</i>	Social Functioning	Vitality	Role Emotional	Mental Health
<b>Panel B:</b>					
<i>Victim of violent crime</i>	-7.069***	-17.411***	-9.415***	-20.667***	-10.192***
<i>SE</i>	(0.735)	(1.676)	(1.139)	(2.422)	(1.098)
<i>Age</i>	0.003	0.187**	0.113	0.502***	-0.074
<i>SE</i>	(0.036)	(0.081)	(0.076)	(0.103)	(0.062)
<i>Age2</i>	0.001	-0.004***	-0.002**	-0.007***	0.001**
<i>SE</i>	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
<i>Education low</i>	-0.911***	-2.599***	-1.463***	-3.055***	-2.452***
<i>SE</i>	(0.247)	(0.610)	(0.444)	(0.791)	(0.425)
<i>Education medium</i>	-0.083	-1.719**	-0.437	-1.492	-0.258
<i>SE</i>	(0.289)	(0.680)	(0.591)	(0.953)	(0.477)
<i>Children 0-4 years</i>	0.084	0.055	-2.498***	0.183	0.934**
<i>SE</i>	(0.235)	(0.457)	(0.473)	(0.578)	(0.406)
<i>Children 5-14 years</i>	-0.171	0.195	-0.869***	0.331	-0.092
<i>SE</i>	(0.147)	(0.292)	(0.312)	(0.344)	(0.250)
<i>Children 15-24 years</i>	-0.024	0.133	-0.497	0.509	0.083
<i>SE</i>	(0.171)	(0.445)	(0.356)	(0.619)	(0.317)
<i>Rain days</i>	0.095	1.428	-2.006	3.395	-4.016
<i>SE</i>	(2.138)	(4.830)	(3.847)	6.464	(3.503)
<i>Unemployment</i>	-0.107	-0.518***	-0.144	-0.443**	-0.188
<i>SE</i>	(0.066)	(0.158)	(0.142)	(0.157)	(0.121)
<i>N</i>	29380	30589	30489	29974	30482

*Continued...*

**Appendix Table 4A: The Impact of having been a victim of crime on wellbeing - OLS  
(victim in the year before the interview date) - cont.**

	(1)	(2)	(3)	(4)	(5)
	<i>MCS</i>	Social Functioning	Vitality	Role Emotional	Mental Health
<b>Panel C:</b>					
<i>Victim of property crime</i>	-1.736***	-3.642***	-2.889***	-5.373***	-2.120***
<i>SE</i>	(0.330)	(0.666)	(0.579)	(0.990)	(0.502)
<i>Age</i>	0.013	0.211**	0.124*	0.537***	-0.061
<i>SE</i>	(0.036)	(0.081)	(0.074)	(0.103)	(0.062)
<i>Age2</i>	0.001	-0.004***	-0.002***	-0.008***	0.001**
<i>SE</i>	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
<i>Education low</i>	-0.976***	-2.713***	-1.559***	-3.225***	-2.542***
<i>SE</i>	(0.248)	(0.607)	(0.448)	(0.790)	(0.423)
<i>Education medium</i>	-0.136	-1.848***	-0.511	-1.617*	-0.323
<i>SE</i>	(0.293)	(0.691)	(0.597)	(0.954)	(0.479)
<i>Children 0-4 years</i>	0.096	0.096	-2.480***	0.203	0.956**
<i>SE</i>	(0.238)	(0.460)	(0.478)	(0.586)	(0.410)
<i>Children 5-14 years</i>	-0.147	0.269	-0.831***	0.355	-0.055
<i>SE</i>	(0.146)	(0.291)	(0.310)	(0.340)	(0.249)
<i>Children 15-24 years</i>	-0.028	0.134	-0.495	0.491	0.083
<i>SE</i>	(0.172)	(0.440)	(0.355)	(0.616)	(0.317)
<i>Rain days</i>	0.417	1.641	-1.437	4.634	-3.459
<i>SE</i>	(2.160)	(4.956)	(3.853)	(6.469)	(3.546)
<i>Unemployment</i>	-0.099	-0.499***	-0.131	-0.426***	-0.178
<i>SE</i>	(0.067)	(0.163)	(0.141)	(0.153)	(0.124)
<i>N</i>	29421	30631	30533	30015	30525

Note: In Panel A we report results for victims of any crime (property or violent crime). Panel B refers to victims of violent crime only, and panel C to victims of property crime. Low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is from bachelor to doctorate. The analysis is for urban areas only. Robust standard errors in brackets. Coefficients with \* are statistically significant at the 5 percent level, those with \*\* at the 1 percent level.

**Appendix Table 5: The Impact of Crime on mental wellbeing of Non Victims - FE  
(crime in the year before the interview date)**

	(1)	(2)	(3)	(4)	(5)
	MCS	Social Functioning	Vitality	Role Emotional	Mental Health
<b>Panel A:</b>					
<i>Total Crime</i>	-0.223	-0.399	-0.229	0.260	-0.270
<i>SE</i>	(0.330)	(0.788)	(0.501)	(0.891)	(0.485)
<i>Age</i>	0.267	1.512***	0.306	1.921***	0.211
<i>SE</i>	(0.160)	(0.325)	(0.256)	(0.616)	(0.250)
<i>Age2</i>	-0.003	-0.018***	-0.005**	-0.023***	-0.004*
<i>SE</i>	(0.001)	(0.003)	(0.002)	(0.006)	(0.002)
<i>Education low</i>	-0.953	-0.904	-1.344	-3.156	-1.530
<i>SE</i>	(1.206)	(1.938)	(2.289)	(3.245)	(2.017)
<i>Education medium</i>	-1.194	-2.254	-2.055	-0.144	-2.374
<i>SE</i>	(1.351)	(2.389)	(2.823)	(3.572)	(2.203)
<i>Children 0-4 years</i>	-0.621**	0.272	-1.897***	-1.076	-0.321
<i>SE</i>	(0.306)	(0.801)	(0.534)	(0.950)	(0.512)
<i>Children 5-14 years</i>	-0.714**	-0.646	-1.151**	-1.131	-1.160**
<i>SE</i>	(0.299)	(0.681)	(0.499)	(0.991)	(0.492)
<i>Children 15-24 years</i>	-0.374	-0.152	-1.105**	-0.975	-0.502
<i>SE</i>	(0.276)	(0.611)	(0.501)	(1.022)	(0.446)
<i>Rain days</i>	0.758	1.295	0.463	4.521	-1.953
<i>SE</i>	(2.274)	(5.520)	(3.772)	(7.405)	(3.678)
<i>Unemployment</i>	-0.009	-0.050	-0.046	0.136	-0.169
<i>SE</i>	(0.069)	(0.141)	(0.127)	(0.338)	(0.117)
<i>N</i>	27266	28408	28311	27835	28305

Continued...

**Appendix Table 5: The Impact of Crime on mental wellbeing of Non Victims - FE  
(crime in the year before the interview date) - cont**

	(1)	(2)	(3)	(4)	(5)
	<i>MCS</i>	Social Functioning	Vitality	Role Emotional	Mental Health
<b>Panel B:</b>					
<i>Violent crime</i>	-1.318**	-2.918**	-1.543**	-2.570	-1.267
<i>SE</i>	(0.509)	(1.215)	(0.726)	(1.832)	(0.802)
<i>Age</i>	0.279*	1.528***	0.317	1.866***	0.229
<i>SE</i>	(0.151)	(0.311)	(0.244)	(0.585)	(0.240)
<i>Age2</i>	-0.003**	-0.018***	-0.005**	-0.023***	-0.004*
<i>SE</i>	(0.001)	(0.003)	(0.002)	(0.006)	(0.002)
<i>Education low</i>	-0.935	-0.862	-1.321	-3.120	-1.511
<i>SE</i>	(1.202)	(1.921)	(2.287)	(3.234)	(2.015)
<i>Education medium</i>	-1.173	-2.212	-2.032	-0.100	-2.357
<i>SE</i>	(1.347)	(2.376)	(2.819)	(3.562)	(2.201)
<i>Children 0-4 years</i>	-0.627**	0.257	-1.905***	-1.095	-0.327
<i>SE</i>	(0.306)	(0.797)	(0.536)	(0.950)	(0.512)
<i>Children 5-14 years</i>	-0.723**	-0.667	-1.162**	-1.149	-1.170**
<i>SE</i>	(0.299)	(0.680)	(0.502)	(0.988)	(0.493)
<i>Children 15-24 years</i>	-0.379	-0.163	-1.112**	-0.979	-0.508
<i>SE</i>	(0.274)	(0.607)	(0.502)	(1.017)	(0.446)
<i>Rain days</i>	0.409	0.499	0.044	3.756	-2.287
<i>SE</i>	(2.259)	(5.527)	(3.785)	(7.345)	(3.672)
<i>Unemployment</i>	-0.009	-0.0492	-0.046	0.140	-0.169
<i>SE</i>	(0.068)	(0.143)	(0.128)	(0.337)	(0.117)
<i>N</i>	27266	28408	28311	27835	28305

Continued...



**Appendix Table 5: The Impact of Crime on mental wellbeing of Non Victims - FE  
(crime in the year before the interview date) - cont**

	(1)	(2)	(3)	(4)	(5)
	<i>MCS</i>	Social Functioning	Vitality	Role Emotional	Mental Health
<b>Panel C:</b>					
<i>Property crime</i>	-0.113	-0.156	-0.100	0.456	-0.161
<i>SE</i>	(0.317)	(0.768)	(0.494)	(0.860)	(0.448)
<i>Age</i>	0.277*	1.536***	0.319	1.949***	0.221
<i>SE</i>	(0.161)	(0.328)	(0.258)	(0.620)	(0.250)
<i>Age2</i>	-0.003**	-0.018***	-0.005**	-0.023***	-0.004*
<i>SE</i>	(0.001)	(0.003)	(0.002)	(0.006)	(0.002)
<i>Education low</i>	-0.953	-0.904	-1.344	-3.155	-1.50
<i>SE</i>	(1.206)	(1.939)	(2.289)	(3.246)	(2.017)
<i>Education medium</i>	-1.194	-2.256	-2.056	-0.143	-2.375
<i>SE</i>	(1.351)	(2.390)	(2.823)	(3.572)	(2.203)
<i>Children 0-4 years</i>	-0.620**	0.274	-1.896***	-1.074	-0.320
<i>SE</i>	(0.306)	(0.801)	(0.534)	(0.950)	(0.512)
<i>Children 5-14 years</i>	-0.714**	-0.646	-1.151**	-1.132	-1.160**
<i>SE</i>	(0.299)	(0.682)	(0.498)	(0.991)	(0.492)
<i>Children 15-24 years</i>	-0.374	-0.153	-1.106**	-0.977	-0.503
<i>SE</i>	(0.276)	(0.612)	(0.501)	(1.022)	(0.446)
<i>Rain days</i>	0.774	1.330	0.482	4.530	-1.934
<i>SE</i>	(2.278)	(5.521)	(3.775)	(7.406)	(3.678)
<i>Unemployment</i>	-0.009	-0.051	-0.047	0.135	-0.170
<i>SE</i>	(0.069)	(0.141)	(0.127)	(0.338)	(0.117)
<i>N</i>	27266	28408	28311	27835	28305

Note: In Panel A we report results for victims of any crime (property or violent crime). Panel B refers to victims of violent crime only, and panel C to victims of property crime. Low education if the highest level of education is Certificate I or II; medium level of education if the highest level of education is a diploma; high education if the highest level of education obtained is from bachelor to doctorate. The analysis is for urban areas only. Robust standard errors in brackets. Coefficients with \* are statistically significant at the 5 percent level, those with \*\* at the 1 percent level.

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**Tel 020 7955 7284 Fax 020 7955 7595**

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