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Crime and Life Satisfaction: Evidence from South Africa - Gauteng Province

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Abstract

This study explores the relationship between life satisfaction and crime in South Africa. Using 2011 and 2015 Quality of Life Survey data we estimate ordered probit models for the Gauteng province. The analysis is based on four subjective well-being measures (i.e., satisfaction with: life as a whole, neighbourhood of residence, standards of living, and safety/security provided by the government in place of residence) and five crime-related measures (i.e., crime rate, being a victim of crime, day, night and safety perceptions). The key findings of this study are that crime has a negative effect on subjective well-being. Strong effects are identified for crime victimization on all subjective well-being measures while weak and statistically insignificant effects are estimated for a broader measure of crime (i.e., the crime rate in the neighbourhood of residence). The study also uncovers the importance of safety perceptions in determining the subjective well-being of Gauteng residents. Notably, as feelings of safety deteriorate subjective well-being tends to reduce as well; a result that is generally consistent across all measures of subjective well-being. Our findings call for concerted efforts to reduce crime levels in the Gauteng Province and the Republic at large.

Keywords Subjective well-being · Life satisfaction · Crime · Safety perceptions

Introduction

There is a growing body of literature considering determinants of life satisfaction (otherwise referred to as subjective well-being). This has delved into the impact of health, education, employment status, income, occupation and family structure on subjective well-being (c.f. 1, Steptoe et al. 2015; Castriota 2007; Easterlin 2001; Frame 2013; Posel and Casale 2011; Posel 2014; Clark et al. 2004; Alston and Dudley

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1973; Botha and Booysen 2014). However, the link between crime and life satisfaction has only received trivial attention in developing countries, especially those in Africa. Yet, understanding this relationship is fundamental for any assessment of social well-being as exposure to crime has long lasting negative effects (Powdthavee 2005). This limited attention in literature is possibly due to data constraints, particularly for crime. Of the few available studies, Davies and Hinks (2010) examined Malawian data for 2005 and found that crime had a negative effect on happiness. Similarly, Sulemana's (2015) study on 20 African countries found that theft, physical assault and crime-related fear all negatively influenced subjective well-being.

For South Africa the scarcity of literature on crime and subjective well-being is echoed as only Powdthavee (2005), Møller (2005) and Sulemana (2015) have explored this topic for the country. Powdthavee (2005) found non-victims of crime reporting significantly higher levels of well-being than victims. Møller (2005) established that fear of crime (measured as a perception concerning the probability of becoming a victim) had a larger effect on life satisfaction than having been a victim of crime. And also that crimes against an individual had a larger negative effect on feelings of safety and well-being than property crimes. This negative effect of crime on life satisfaction in South Africa was also uncovered by Sulemana's (2015) cross country study. Although informative these studies, however, do not go unscathed.

Powdthavee (2005) utilises data from the 1990s which is now outdated and requires updating in light of South Africa's growing efforts to reduce crime and improve well-being. Also its household rather than individual level measure of subjective well-being is questionable. The information was supplied by a household representative which brings somewhat of inaccuracy, especially on feelings associated with direct victims of crime. As for Sulemana (2015), it utilises a rather narrow measure of subjective well-being which is truncated to an individual's living conditions.[1] The study also presents a country level picture which potentially masks substantial spatial heterogeneities that characterise South Africa's socio-economic landscape. Provinces across South Africa are not equally developed, nor do they suffer the same crime rates, or have had the same level of government investment. Consequently, disaggregated studies e.g., Møller's (2005) study on Nelson Mandela Metropolitan Municipality (NMMM) are potentially more informative. However, the extent to which Møller's (2005) findings can be extended to other regions of the country remains questionable. It is also notable that currently none of the extant studies has investigated the relationship between crime and life-satisfaction over time, yet this is important given the South African government's efforts to curb crime in the country.

In light of the above, the present study aims to extend localised studies by exploring the impact of crime on life satisfaction and its evolution in the Gauteng Province for 2011 and 2015. Furthermore, this study goes beyond previous studies which often rely on a single measure of crime or life satisfaction by using various measures than previously allowed for. This type of analysis is, however, not possible for all provinces in the country due to data constraints.[2] Nevertheless, the Gauteng province is an interesting area of study in its own right. Though it only occupies 1.4% of South

[1] Respondents are asked "In general, how would you describe your own present living conditions".
[2] Data containing various measures of life satisfaction and a significant sample of individuals across suburbs is only available for the Gauteng province which administers the Quality of Life Survey (QoL survey).

Africa's land mass, it is the country's economic hub producing 35% of the country's total output[3] and contributes around 7% towards Africa's GDP (Molokwane 2014).

Background: Crime and Life Satisfaction in South Africa

South Africa is considered as one of the most violent and unsafe countries in the World; it ranks as the 15th worst country in regard to security and safety, and the 8th most violent country in the world (Business Tech 2015). In comparison to other BRICS countries, South Africa has the highest level of crime – it is ranked as the 6th worst country in the world while Brazil is ranked 10th, Russia 35th, India 45th and China 83rd (Nation Master 2017).

High crime rates in South Africa have been partly attributed to the legacy of Apartheid. Prior to democracy in 1994, South African citizens (specifically poor and black citizens) had little reason to believe in and respect the law, policing and criminal justice all of which were rooted in an unjust system of institutionalised racism. Characterised by gross violation of human rights, Apartheid policies were designed to oppress black South Africans in every aspect of life for instance: forced removals through the Group Areas Act instituted in 1950; the development of Bantustans through the Bantu Homelands Citizens Act in 1970; Bantu education instituted in 1953; pass and labour laws instituted by the Black (Natives) Laws Amendment Act of 1952; racial segregation of vehicles services and public provisions through the Reservation of separate amenities Act in 1953; all imposed severe restrictions and created a highly unequal society. This repressive environment created conflict, perpetuated a cultural norm of crime as a means to an end and exposed many to police brutality and a violent prison system (Moodley 2015). Notably, policing during this era was focused on thwarting resistance and enforcing the laws of Apartheid on black South Africans, whilst protecting the white citizenry. Consequently, rather than curbing crime in townships, concerted efforts were expended towards preventing crime in townships from infiltrating into white neighbourhoods (Shaw 2002). This created a system of norms and beliefs regarding crime as a necessity to resolve difficulties in townships where informal methods of justice were often relied upon (Moodley 2015). The resulting social disarray fostered a violent culture which still remains.

Determining the precise levels of crime under Apartheid is difficult because police were more concerned with controlling black people, not preventing crime in black townships. The low levels of trust in the police also meant that black people seldom reported crimes (Shaw 2002). Nonetheless, available evidence points toward high levels of crime experienced in townships during the 1950s, with increases in crime reaching a peak during the transitional period into democracy (Shaw 1997). From 1990 to 94 it was estimated that almost all crimes increased to record levels during which South African violent crimes increased by 35% (Shaw 1997). Given these developments, it is not surprising that fear of crime is a significant issue in South Africa. Around a third of residents were reported to be afraid of walking alone in their neighbourhoods and avoid parks and open spaces (Davis 2017). Although crime rates

[3] In 2008 Gauteng contributed around 35.5% of annual growth to the national economy, rising to a figure of 36.1% in 2013, and has been forecasted to rise to 36.2% in 2017 (Molokwane 2014).

are still high, recent crime statistics paint an optimistic picture (Gqirana 2017). The South African Police Forces' (SAPS) 2016 annual report points to a decrease in crime between 2015 and 2017 (Business Tech 2017). In the Gauteng province, crime has also been reported to be on the decline over the period 2005–15. However despite this decline, 2017 statistics indicate that Gauteng contributes most toward total crimes committed in South Africa (Crime Stats SA 2017).

Regarding life satisfaction; in a survey conducted for the "Quality of Life Trends Project", over 180 indicators of happiness and satisfaction showed that during Apartheid white South Africans were the most satisfied with most aspects of life; black South Africans were the least satisfied while Indians/Asians and Coloureds' satisfaction with most aspects of life lay somewhere in between (Møller 2001). For a fleeting moment in 1994 most South Africans reported being satisfied with life, but 5 years following the first South African democratic elections, and despite the rise in living conditions, subjective well-being was still found to vary substantially between different racial groups (Møller 2001). This indicates the continued existence of social divides which were established during Apartheid. Early studies examining quality of life in South Africa indicate a "crossover" whereby white people reported being mostly satisfied with their lives, but pessimistic regarding the future; whilst the democratic promise of "better lives for all" meant that black people reported being mostly dissatisfied with their lives, but more optimistic regarding the future (Møller 2001).

More recent estimates indicate that South Africa is generally characterised by low levels of happiness. According to the United Nation's 2016 World Happiness report South Africa was ranked as the 116th happiest country out of 156 countries, a drop from its 113th place in 2015 (Business Tech 2016). In comparison to other BRICS countries, South Africa ranks top in the Nation Master's quality of life measure; South Africa ranks 31st, India ranks 46th, Brazil ranks 58th, China ranks 61st and Russia ranks 67th (Nation Master 2017). Compared to other African countries, South Africa is considered to be one of the happiest, although its average happiness level is lower compared to Western Europe and the United States of America (Rothmann and Veenhoven 2015). Finally, while it is interesting to have some insights on whether heterogeneities exist in life satisfaction across South African provinces, it is unfortunate that no information pertaining to such a comparison is readily available.

Review of Previous Studies

Recently social scientists and policy makers have increasingly become interested in subjective well-being (i.e., happiness or life satisfaction). This concept refers to an individual's ability to lead creative, healthy and fulfilling lives and broadly relates to an individual's quality of life (Western and Tomaszewski 2016). Happiness is greatly valued in modern day society and there is growing support for the idea that government policy should be aimed at generating a happy citizenry (Veenhoven 2009).

Within the Economics discipline, well-being generally relates to how individual welfare is affected by-inflation, inequality, growth and institutional factors inter alia (Frey et al. 2008). It is envisaged that life circumstances, and specifically employment and income have long-term effects on happiness. Income, in particular, was thought for a long time to be a suitable, yet insufficient, proxy for happiness (Frey et al. 2008). The

general consensus of this theory rests on the "more is better" principle (Frey and Stutzer 2002). This implies that individuals can improve their levels of satisfaction by having access to higher incomes; therefore public policies have aimed at increasing income/economic growth so as to raise overall well-being (Bruni and Porta 2005). Although economists agree that happiness/satisfaction depends on several factors apart from material possessions; they still tend to assume that an increase in income is associated with an overall increase in happiness/satisfaction levels (Frey and Stutzer 2002; Bruni and Porta 2005). However, these economic explanations do not provide a sufficient link between crime, a non-economic factor, and subjective well-being; hence we tap into findings from psychology literature. As such, being a victim of crime may affect an individual's mental well-being due to shock, depression, fear, anxiety or perception of loss of personal esteem and security (Powdthavee 2005). This mental distress has in turn been found to be negatively associated with subjective well-being among crime victims (Michalos and Zumbo 2000). A similar effect has also been reported for fear of outdoor crime victimisation as it restricts one indoors which brews psychological trauma and loss of happiness (Fried 1984; Ross 1993; Powdthavee 2005).

On the empirical side, a number of international studies examined the link between crime and happiness. These include Cornaglia et al. (2014) for Australia; Cheng and Smyth (2015) for China; Di Tella et al. (2008) for Latin America; Di Tella and Schargrodsky (2009) for Argentina; Michalos and Zumbo (2000) for British Columbia; Cohen (2008) for the United States of America; and Kuroki (2013) for Japan. Generally these studies – although conducted in very different contexts – find an empirical regularity indicating that fear of crime and being a victim of crime is negatively associated with overall life satisfaction.

Within the African region, such literature is still very limited; a thorough search yields only two non-South African studies. The first study, Davies and Hinks (2010) examines the impact of crime on happiness in Malawi. They find that crime has a negative effect on happiness. Streamlining the results by gender revealed that men and women tend to react differently to different criminal activities: only feelings of insecurity had a negative effect on happiness for women, but violent attacks had a negative effect on males. In addition they found a U-shaped crime-happiness relationship. Happiness was at its lowest in a neighbourhood when 11.2% of its residents had been victimised. The second study, Sulemana (2015) examined data from 20 African countries and found that theft, physical assault and crime-related fear all negatively influenced subjective well-being. From a gender perspective, while physical assault had a significant negative effect on well-being for both genders, fear of crime had a significant negative effects only among women (Sulemana 2015).

For South Africa, there are two studies - as mentioned earlier - which examine the relationship between crime and life satisfaction. The first, Powdthavee (2005), employed ordered probit models and cross-sectional data from the 1997 October Household Survey produced by Statistics South Africa to explore subjective well-being for crime victims. The underpinning measure of well-being dwelt on five ordinal categories of how satisfied a household was with the way it lived those days; ranging from (1) very dissatisfied to (5) very satisfied. Hence, a household's rather than individual's subjective well-being was the target of the study. This raises concern on whether the responses as furnished by a household representative accurately reflected the well-being of all household members, especially direct victims of crime. The

studied crimes were limited to property (burglary, robbery or housebreaking) and violent crimes (household experience of murder). Results showed that crime victims had inferior well-being compared to non-victims – property crimes had a bigger negative effect than violent crime on victims' well-being. Living in a high crime zone also reduced life satisfaction of non-victims, and crime hurt less for victims who lived in high crime areas. However, it is unclear whether results uncovered here are still relevant today as the data used was for two decades ago, also the extent to which these findings apply to different South African regions remains an empirical issue.

The second study by Møller (2005) assessed criminal victimisation and quality of life in the Eastern Cape Province's Nelson Mandela Metropolitan Municipality (NMMM). The analysis utilised primary data for 3300 householders. This captured crime experiences at household and personal levels including robberies, sexual assault, murders, burglaries, car hijacking, vehicle and stock theft. For well-being, respondents voiced their perceptions about overall life satisfaction, neighbourhood (e.g. crime, policing and service delivery) and personal quality of life (personal safety). Bivariate exploratory techniques and a stepwise regression on an index of personal life satisfaction were employed for the analysis. Findings showed that fear of crime and concern about personal safety had a larger negative correlation with life satisfaction than actual victimisation. Crimes experienced at personal level reduced life satisfaction more when compared to property crimes. However the effect of crime on well-being was dominated by racial inequalities linked to unemployment, poverty and inequality. Nonetheless, the characterisation of the victim–quality of life relationship in this study cannot be generalised to other regions of the country due to spatial differences in distribution of key information for a typical study. Based on this review, the relationship between crime and happiness largely remains unexplored, particularly from an African and even more so from a South African perspective. This study seeks to add to this scarce literature by providing further insights on the impact of crime on life satisfaction using more recent data from the Gauteng province.

Methodology and Data

Methods

To identify the effect of crime on life satisfaction, we estimate a life satisfaction function using a pooled ordered probit model for 2011 and 2015. The ordered multiple choice model for the latent variable y_i^* is specified as:

$$\begin{aligned} y_i^* &= x_i'\beta + \gamma \text{crime}_i + u_i, \\ y_i &= j \text{ if } \alpha_{j-1} < y_i^* \leq a_j \end{aligned} \tag{1}$$

where y_i is individual i's measure of subjective well-being with values j: 1 (very dissatisfied) to 5 (very satisfied). We utilize various measures for life satisfaction; this includes life satisfaction in general and measures specifically related to satisfaction with neighbourhoods, satisfaction with the safety/security provided by the government in one's neighbourhood and the standard of living; x is a vector of individual

characteristics (i.e., race, gender, age, education, employment status, income, household size, disability status and neighbourhood fixed effects); crime is the rate of crime in one's neighbourhood of residence i.e., the number of crimes per 10,000 people. We also use crime victimization and fear of crime as additional measures of crime. The former is based on a question in the surveys asking respondents whether they were a victim of crime in the past year while the latter is based on a question on whether the respondent feels safe when walking in their area of residence or when at home. In Eq. (1), β and $\gamma$are parameters to be estimated and $u_i$is the error term. The coefficient of interest γmeasures the effect of crime on life satisfaction. The probability that individual i selects alternative j in the life satisfaction responses is:

$$\begin{aligned} P_{ij} &= P(y_i = j) = P\left(\alpha_{j-1} < y_i^* \leq \alpha_j\right) \\ &= \Phi\left(\alpha_j - x_i'\beta - \gamma \text{crime}_i\right) - \Phi\left(\alpha_{j-1} - x_i'\beta - \gamma \text{crime}_i\right) j = 2, \ldots j-1 \end{aligned} \tag{2}$$

where Φ is the cumulative standard normal distribution function. The coefficient of interest γ is expected to be negative which can be interpreted as an indication that an increase in the crime rate is associated with a decrease in life satisfaction.

Admittedly, this analysis is potentially biased due to the problem of endogeneity arising from two sources. The first source is omitted variables i.e., there may be unobservable factors correlated with crime and life satisfaction which are omitted in our specification and thus can potentially bias our estimates. The second source is reverse causality; crime may cause people to be less happy while people who are unsatisfied with life may resort to crime. Panel data models as well as instrumental variable techniques are ideal for solving this endogeneity problem. Unfortunately, the present study is unable to deal with this problem due to data constraints as the dataset at use is cross-sectional and does not have convincing instrumental variables for crime measures. Consequently, results from this study do not have a causal interpretation. Notwithstanding, findings from this study will still provide some important insights into the effect of crime on life satisfaction in the Gauteng province.

Data

This study utilizes data drawn from two sources. The first source is the Quality of Life (QoL) survey conducted by the Gauteng City Region Observatory (GCRO) to gauge the quality of life in Gauteng. This contains a rich set of information on life satisfaction, demographics, suburb of residence, economic activities, crime victimisation and crime perceptions. The 2011 and 2015 surveys collect information on 16,729 and 30,002 respondents, respectively. The second data source is the Institute of Security Studies (ISS) Crime Hub. This compiles data on number of crimes (total and disaggregated by type of crime) by suburb. In the GCRO data we observe the suburbs in which an individual resides, and in the Crime Hub data we observe the reported total number of crimes within a given suburb. Therefore we merge the two datasets on the basis of the suburb identifier variable.

Notably, the decision to use the GCRO QoL survey as opposed to using data from the National Income Dynamics Study (NIDS) survey is that while it contains some information on life satisfaction, the main purpose of NIDS is to analyse income

dynamics, whereas the primary purpose of the GCRO QoL survey is to understand the quality of life in Gauteng. Thus, NIDS collects information on the general measures of life satisfaction and does not breakdown life satisfaction into specific components like satisfaction with conditions of living, neighbourhoods and police services which the QoL does. The GCRO survey, on the other hand, asks an array of life satisfaction questions encompassing the aforementioned various areas as well as a general measure of life satisfaction. Thus, the GCRO data offers scope for a more detailed analysis than was previously possible.

The final sample used in the analysis is restricted to individuals with full information on our key variables that are comparable in the 2011 and 2015 surveys. The key variables include subjective well-being variables i.e., satisfaction with life as a whole, neighbourhood satisfaction, satisfaction with standard of living, satisfaction with safety and security as well as relevant demographic, socio-economic and crime variables as described in Table 6 in the appendix. The sample was further restricted to individuals aged 18 years and above. This sample cleaning process leaves 6078 and 14,991 respondents (men and women) for 2011 and 2015, respectively. The outcome variables for subjective well-being ranges from 1 to 5 with 1 indicating 'least satisfied' and 5 indicating 'most satisfied'. The number of crimes in a suburb was normalised to account for population differences across suburbs by calculating the crime rate i.e., crimes per 10,000 people. Table 1 presents descriptive statistics of the key variables for 2011 and 2015.

On average, satisfaction with life as a whole increased between 2011 and 2015 in Gauteng. This is also true for satisfaction with neighbourhood and standard of living, but not for satisfaction with safety which registered a decline. Pertaining to crimes, statistics show a general decrease in reported total crime rates between 2011 and 2015. On average, 585 total contact crimes per 10,000 were recorded in 2011 compared to 504 total contact crimes per 10,000 people recorded in 2015. Consistent with this finding is the 2% point decline in the share of victims of crime in the same period. In regard to safety when walking around one's residential area during the day, most respondents (46%) reported being 'fairly safe', followed by 32% who report feeling 'very safe' in 2011. These results were mirrored in 2015 statistics. In contrast for safety when walking around one's residential area at night, most respondents in 2011 (38%) and 2015 (39%) felt 'very unsafe'. Finally, for safety at home about 7% (8%) of the respondents felt 'very unsafe' in 2011 (2015). Overall, although recorded crime statistics registered a decline, this is not matched with a consistent increase in satisfaction with (day and night) safety; rather the preliminary analysis shows a general deterioration in the sense of safety among Gauteng residents.

For other variables, statistics indicate that the final sample is mainly composed of females (54% in 2011 and 51% in 2015) with an average age of 37 years. Consistent with the country's racial profile, Africans account for over 80% of the sample. In terms of education, about 13% of the respondents were lowly educated (i.e. no schooling and primary education) in 2011 which slightly decreased to 10% in 2015. This was matched by an increase in the proportion of individuals in the upper tail of the distribution (i.e., tertiary education). In 2011, 53% of the respondents were unemployed which declined by 16% points in 2015. In addition 4–5% of the respondents reported to have had some

Table 1 Descriptive statistics

	2011		2015	
	Mean	SD.	Mean	SD.
Subjective well-being measures:				
Satisfaction with: Life	3.34	1.16	3.56	1.13
Neighbourhood	3.46	1.07	3.59	1.10
Standard of living	3.14	1.16	3.42	1.19
Safety	3.03	1.27	2.87	1.21
Crime measures:				
Crime per 10,000 people	585	5100	504	3156
Victim of crime	0.24	0.43	0.22	0.41
Day safety: Very safe	0.32	0.46	0.29	0.45
Fairly safe	0.46	0.50	0.42	0.49
Neither	0.07	0.25	0.09	0.28
Bit unsafe	0.09	0.29	0.13	0.34
Very unsafe	0.06	0.25	0.07	0.25
Night safety: Very safe	0.07	0.26	0.07	0.26
Fairly safe	0.20	0.40	0.20	0.40
Neither	0.09	0.29	0.09	0.29
Bit unsafe	0.26	0.44	0.25	0.43
Very unsafe	0.38	0.48	0.39	0.49
Home safety: Very safe	0.31	0.46	0.34	0.47
Fairly safe	0.40	0.49	0.38	0.49
Neither	0.11	0.32	0.09	0.28
Bit unsafe	0.11	0.31	0.11	0.32
Very unsafe	0.07	0.26	0.08	0.26
Demographics:				
Female	0.54	0.50	0.51	0.50
Male	0.46	0.50	0.49	0.50
African	0.85	0.36	0.86	0.34
Age	37.3	12.4	36.8	11.8
Low education	0.13	0.34	0.10	0.30
Tertiary education	0.18	0.39	0.23	0.42
Low income	0.38	0.49	0.32	0.47
Unemployed	0.53	0.50	0.37	0.48
Disabled	0.05	0.21	0.04	0.19
Household size	3.94	2.18	3.67	2.54
N	6078		14,991	

form of disability. Household size has remained fairly stable overtime at 4 members on average. Finally, the share of households in the low income category (R0–1601 per month) decreased by 6% points from 38% in 2011.

Empirical Results

This section presents results (coefficient, marginal effects and corresponding standard errors – clustered by suburb of residence) obtained from the ordered probit model estimating the impact of crime on subjective well-being (as measured by satisfaction with life as a whole, satisfaction with neighbourhood, standard of living and safety/security). For compactness, we only report results for the 'very satisfied' category of each subjective well-being measure. Table 2 presents results of the impact of crime (i.e., contact crimes per 10,000 people) on the various measures of subjective well-being, and for when crime is measured by crime victimization (i.e., 'being a victim of crime'). Estimates of the effect of perceived day, night and home safety on various measures of subjective well-being are also given in Table 2. Tables 3 and 4 present results for the effect of other covariates on measures of subjective well-being, while Table 5 presents results for gender and subjective well-being. All models control for age, age-squared, gender, race, education, disability status, unemployment status, household income, household size and year.

Main Results: Effect of Crime on Subjective Well-Being

Effect of Neighbourhood Crime Rate on Subjective Well-Being Table 2 presents ordered probit estimates of the effect of a neighbourhood's crime rate (measured as the number of total contact crimes per 10,000 people in a respondent's residential area) on various measures of subjective well-being. The results indicate that neighbourhood crime rate has a negative statistically significant effect on satisfaction with neighbourhood and with standard of living, while the effect is insignificant for satisfaction with life as a whole and with safety/security. Thus, as the crime rate increases individuals are less likely to report being 'very satisfied' with their subjective well-being as proxied by their neighbourhood and standard of living.

Effect of Crime Victimization on Subjective Well-Being Table 2 also presents estimates of the impact of being a victim of crime on subjective well-being. Unlike the crime rate used in the preceding section which is more of a broader measure of exposure to crime, crime victimization measures actual individual experiences. This gives insights on the impact of first hand crime-experiences on subjective well-being. Compared to the effects uncovered when neighbourhood crime rates are used, the effects of first-hand crime experience are much stronger. The results show that being a victim of crime has negative statistically significant effects on all measures of well-being. Examining closely the marginal effects, respondents are less likely to report being 'very satisfied' with their life as a whole, standard of living, their neighbourhood and safety/security provided by the government in their residential area. Victims of crime are less likely to report being 'very satisfied' by a probability of about 4% across these measures of well-being.

Effect of Day, Night and Home Safety Perceptions on Subjective Well-Being Results for ordered probit estimates of the impact of day, night and home safety perceptions on subjective well-being are also given in Table 2. These perceptions of crime incorporate everyone which gives a more general result on the impact of safety

Table 2 Effect of crime and safety perceptions on subjective well-being

Very satisfied with:	Contact crime		Victim of crime		Day safety perception		Night safety perception		Home safety perception	
	Coef.	mfx	Coef.	mfx	Coef.	mfx	Coef.	mfx	Coef.	mfx
Life as a whole	−0.017	−0.004	−0.163***	−0.041***	−0.582***	−0.115***	−0.466***	−0.115***	−0.562***	−0.113***
	(0.014)	(0.004)	(0.026)	(0.006)	(0.065)	(0.009)	(0.062)	(0.014)	(0.075)	(0.011)
Neighbourhood	−0.036**	−0.009**	−0.182***	−0.042***	−0.622***	−0.111***	−0.649***	−0.146***	−0.522***	−0.098***
	(0.018)	(0.004)	(0.026)	(0.006)	(0.091)	(0.010)	(0.066)	(0.014)	(0.085)	(0.011)
Standard of living	−0.031*	−0.007*	−0.174***	−0.040***	−0.475***	−0.091***	−0.560***	−0.126***	−0.505***	−0.095***
	(0.016)	(0.004)	(0.024)	(0.005)	(0.075)	(0.011)	(0.068)	(0.014)	(0.074)	(0.011)
Safety	0.024	0.003	−0.350***	−0.039***	−1.337***	−0.066***	−1.669***	−0.149***	−1.302***	−0.065***
	(0.019)	(0.003)	(0.030)	(0.003)	(0.052)	(0.005)	(0.078)	(0.010)	(0.117)	(0.004)

All models control for age, age-squared, gender, race, education, disability, unemployment status, household income, household size and year. Reported estimates are for the 'very satisfied' category for each subjective well-being measure and 'very unsafe' category for day, night and home safety with reference group being 'very safe' category. Standard errors in parentheses are clustered by main place. Significance level: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 3 Marginal effects of other covariates on satisfaction with life as a whole and neighbourhood

	Contact crime		Victim of crime		Night safety		Day safety		Home safety	
Panel A: Satisfaction with life as a whole										
Age	−0.001	(0.001)	−0.001	(0.001)	−0.001	(0.001)	−0.001	(0.001)	−0.001	(0.001)
Age-squared	0.000	(0.000) **	0.000	(0.000) **	0.000	(0.000) **	0.000	(0.000) **	0.000	(0.000) **
Female	0.010	(0.005) *	0.009	(0.005) *	0.014	(0.005) ***	0.014	(0.005) ***	0.014	(0.005) ***
African	−0.087	(0.012) ***	−0.088	(0.012) ***	−0.079	(0.012) ***	−0.089	(0.011) ***	−0.081	(0.011) ***
Low education	−0.031	(0.009) ***	−0.033	(0.009) ***	−0.032	(0.009) ***	−0.030	(0.009) ***	−0.026	(0.009) ***
Unemployment	−0.055	(0.008) ***	−0.056	(0.008) ***	−0.050	(0.008) ***	−0.051	(0.008) ***	−0.049	(0.008) ***
Disabled	−0.042	(0.013) ***	−0.039	(0.013) ***	−0.041	(0.013) ***	−0.038	(0.014) ***	−0.038	(0.013) ***
Low hh. income	−0.058	(0.008) ***	−0.058	(0.007) ***	−0.054	(0.007) ***	−0.055	(0.007) ***	−0.054	(0.007) ***
Household size	0.000	(0.001)	0.001	(0.001)	0.001	(0.001)	0.001	(0.001)	0.001	(0.001)
Year - 2011	−0.044	(0.008) ***	−0.041	(0.008) ***	−0.044	(0.008) ***	−0.047	(0.007) ***	−0.041	(0.007) ***
Panel B: Satisfaction with neighbourhood										
Age	0.001	(0.001)	0.001	(0.001)	0.001	(0.001)	0.001	(0.001)	0.001	(0.001)
Age-squared	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Female	−0.007	(0.004) *	−0.008	(0.004) *	−0.002	(0.004)	−0.003	(0.004)	−0.003	(0.004)
African	−0.092	(0.019) ***	−0.095	(0.020) ***	−0.082	(0.019) ***	−0.097	(0.018) ***	−0.088	(0.018) ***
Low education	−0.027	(0.008) ***	−0.030	(0.007) ***	−0.029	(0.007) ***	−0.027	(0.007) ***	−0.023	(0.007) ***
Unemployment	−0.034	(0.008) ***	−0.036	(0.008) ***	−0.028	(0.008) ***	−0.029	(0.008) ***	−0.028	(0.008) ***
Disabled	−0.032	(0.011) ***	−0.029	(0.011) **	−0.030	(0.011) ***	−0.028	(0.012) **	−0.028	(0.012) **
Low hh. income	−0.047	(0.007) ***	−0.047	(0.007) ***	−0.042	(0.006) ***	−0.045	(0.007) ***	−0.043	(0.007) ***
Household size	−0.001	(0.001)	−0.001	(0.001)	0.000	(0.001)	−0.001	(0.001)	−0.001	(0.001)
Year - 2011	−0.027	(0.008) ***	−0.026	(0.008) ***	−0.030	(0.008) ***	−0.033	(0.008) ***	−0.026	(0.007) ***

Reported marginal effects are for the 'very satisfied' category for each subjective well-being measure. Standard errors in parentheses are clustered by main place. Significance level: *p < 0.10, **p < 0.05, ***p < 0.01

Table 4 Marginal effects of other covariates on satisfaction with standard of living and safety

	Contact crime		Victim of crime		Night safety		Day safety		Home safety	
Panel A: Satisfaction with standard of living										
Age	−0.001	(0.001)	−0.001	(0.001)	−0.001	(0.001)	−0.001	(0.001)	−0.001	(0.001)
Age-squared	0.000	(0.000) *	0.000	(0.000) *	0.000	(0.000)	0.000	(0.000) *	0.000	(0.000)
Female	0.004	(0.005)	0.003	(0.005)	0.010	(0.005) **	0.008	(0.005)	0.008	(0.005) *
African	−0.115	(0.015) ***	−0.118	(0.014) ***	−0.105	(0.014) ***	−0.119	(0.014) ***	−0.111	(0.013) ***
Low education	−0.028	(0.009) ***	−0.030	(0.009) ***	−0.029	(0.009) ***	−0.028	(0.009) ***	−0.024	(0.008) ***
Unemployment	−0.056	(0.008) ***	−0.057	(0.008) ***	−0.050	(0.007) ***	−0.053	(0.008) ***	−0.051	(0.007) ***
Disabled	−0.039	(0.013) ***	−0.035	(0.014) ***	−0.037	(0.013) ***	−0.036	(0.014) ***	−0.035	(0.013) ***
Low hh. Income	−0.054	(0.005) ***	−0.054	(0.005) ***	−0.048	(0.005) ***	−0.052	(0.005) ***	−0.050	(0.005) ***
Household size	−0.001	(0.001)	−0.001	(0.001)	−0.001	(0.001)	−0.001	(0.001)	−0.001	(0.001)
Year - 2011	−0.046	(0.007) ***	−0.046	(0.007) ***	−0.048	(0.007) ***	−0.050	(0.006) ***	−0.046	(0.006) ***
Panel B: Satisfaction with Safety/Security in neighbourhood										
Age	−0.001	(0.001) **	−0.001	(0.001) *	−0.006	(0.004)	−0.001	(0.000) **	−0.001	(0.000) *
Age-squared	0.000	(0.000)	0.000	(0.000)	0.000	(0.000) *	0.000	(0.000)	0.000	(0.000)
Female	−0.008	(0.003) ***	−0.009	(0.003) ***	0.000	(0.020)	−0.004	(0.003)	−0.003	(0.003)
African	−0.026	(0.008) ***	−0.024	(0.008) ***	−0.039	(0.050)	−0.022	(0.007) ***	−0.015	(0.006) **
Low education	−0.005	(0.004)	−0.005	(0.004)	−0.039	(0.028)	−0.003	(0.003)	0.001	(0.003)
Unemployment	−0.024	(0.004) ***	−0.024	(0.004) ***	−0.011	(0.003) ***	−0.018	(0.004) ***	−0.017	(0.003) ***
Disabled	−0.012	(0.006) *	−0.009	(0.006)	−0.008	(0.004) *	−0.006	(0.006)	−0.007	(0.006)
Low hh. Income	−0.024	(0.004) ***	−0.023	(0.004) ***	−0.012	(0.003) ***	−0.018	(0.004) ***	−0.016	(0.003) ***
Household size	−0.002	(0.001) ***	−0.002	(0.001) ***	−0.006	(0.004)	−0.001	(0.001) **	−0.001	(0.001) ***
Year - 2011	0.028	(0.008) ***	0.029	(0.007) ***	0.019	(0.005) ***	0.019	(0.006) ***	0.025	(0.005) ***

Reported marginal effects are for the 'very satisfied' category for each subjective well-being measure. Standard errors in parentheses are clustered by main place. Significance level: *p < 0.10, **p < 0.05, ***p < 0.01

Table 5 Gender (marginal) effects on subjective well-being

Very satisfied with:	I		II		III		IV		V	
	Female	Female x contact crime	Female	Female x victim of crime	Female	Female x day safety perception	Female	Female x night safety perception	Female	Female x home safety perception
Life as a whole	0.016	−0.001	0.010**	−0.005	0.044***	−0.112***	0.036*	−0.015	0.014*	0.008
	(0.026)	(0.005)	(0.005)	(0.010)	(0.009)	(0.010)	(0.022)	(0.023)	(0.007)	(0.022)
Neighbourhood	−0.006	0.000	−0.003	−0.022**	0.018**	−0.110***	0.009	−0.010	−0.003	0.000
	(0.022)	(0.004)	(0.005)	(0.010)	(0.007)	(0.012)	(0.016)	(0.018)	(0.006)	(0.018)
Std. of Living	0.025	−0.004	0.004	−0.005	0.027***	−0.086***	0.019	0.000	0.008	−0.002
	(0.021)	(0.004)	(0.007)	(0.007)	(0.009)	(0.011)	(0.021)	(0.024)	(0.006)	(0.018)
Safety/security	−0.007	0.000	−0.008***	−0.005	0.017***	−0.064***	0.010	−0.012	−0.004	−0.011
	(0.010)	(0.002)	(0.003)	(0.004)	(0.004)	(0.005)	(0.009)	(0.009)	(0.005)	(0.009)

Standard errors in parentheses are clustered by main place. All models also control for a corresponding crime measure, age, age-squared, race, disability status, unemployment status, household income, household size and year. Day-, night- and home-safety perception coefficients reported here are for the 'very unsafe' category. Significance level: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

feelings (formed perhaps on the basis of actual or anticipated crime experiences) on subjective well-being.

Regarding *day safety*, feelings of safety when walking in one's residential neighbourhood during the day have statistically significant negative effects on all measures of subjective well-being. The marginal effects suggest that individuals who feel 'very unsafe' are about 12% less likely to report being 'very satisfied' with life as a whole relative to those who feel 'very safe' when walking in their neighbourhood during the day. A similar result is also uncovered for satisfaction with one's neighbourhood (−11%), standard of living (−9%) and safety (−7%). Thus as perceptions of day safety deteriorate well-being also diminishes considerably.

Concerning *night safety,* Table 2 also shows estimates for the effects of night safety perceptions (i.e., respondent's safety feeling when walking in own neighbourhood at night) on various measures of subjective well-being. We find a negative effect on subjective well-being and this is statistically significant at the 1% level, and stronger when compared to effects uncovered for day safety perceptions. Relative to those who feel 'very safe' at night, the probability of being 'very satisfied' with life as a whole is 12% less for individuals who feel 'very unsafe'. This finding extends to other measures of subjective well-being (i.e., satisfaction with neighbourhood (−14.6%), standard of living (−12.6%), safety/security patterns (−14.9%). The results also suggest that safety feelings at night have the strongest impact on satisfaction with safety/security, relative to other measures of well-being.

As for *home safety,* results on the effect of home safety perceptions (i.e., how safe one feels in own home) on subjective well-being are also presented in Table 2. All four subjective well-being measures have negative coefficients on the home safety dummy variable and these are statistically significant at the 1% level. These results indicate that if a respondent feels 'very unsafe' in their home, they are less likely to be 'very satisfied' across all measures of subjective well-being. For satisfaction with life as a whole, respondents who feel 'very unsafe' at home are 11.3% less likely to be 'very satisfied' relative to those who feel 'very safe' at home. Similar to previous findings on day and night safety perceptions, home safety estimates also indicate that individuals are more likely to report low levels of satisfaction as their sense of safety. This finding applies to all other subjective well-being measures (i.e., satisfaction with neighbourhood (−9.8%), standard of living (−9.5%) and safety/security (−6.5%).

Additional Results: Effect of Other Covariates of Subjective Well-Being

All regression results presented in the preceding sections control for age, age-squared, race, level of education, disability status, unemployment status, household income and household size. While it would be ideal to control for marital status and health status of respondents as they are likely to have an effect on subjective well-being, it is unfortunate that the questions capturing these variables are not consistent in the 2011 and 2015 surveys and hence are omitted from the regressions. In total, twenty regressions were estimated (i.e.,

estimations on four outcome variables and five measures of crime). Due to space limitations only marginal effects for the 'very satisfied' category and corresponding standard errors of the covariates are presented in Table 3 and Table 4. These tables also indicate whether the identified effects are statistically significant at the usual levels.

Panel A of Table 3 presents results for 'very satisfied' with life as a whole. A statistically significant U-shaped age-satisfaction with life as a whole profile is evident across all crime measures. Thus, as age increases satisfaction with life as a whole tends to decrease until a certain age after which satisfaction begins to increase with an increase in age. For satisfaction with neighbourhood of residence (Panel B), age-effects are insignificant while the effects are not robust for standard of living (Table 4 Panel A) and safety/security (Table 4 Panel B). Thus age has an inconsistent effect on subjective well-being.

Regarding gender effects, women are more likely to be more satisfied with life as a whole relative to men and less likely to be satisfied with their neighbourhood and safety/security, though results are not stable across measures of crime. Across all measures of subjective well-being, results show statistically significant racial effects; Africans, have lower subjective well-being relative to whites, Coloureds and Indian/Asians. This racial effect is largest on satisfaction with standard of living (around −11%), and smallest on satisfaction with safety or security in neighbourhood (around 2%). When compared to the effects of crimes, perceptions of safety and other covariates on satisfaction with standard of living, the racial effect is only outweighed by perceptions of a 'very unsafe' neighbourhood at night. These strong racial effects are potentially reflective of the legacy of Apartheid – a view consistent with Møller (2001).

The findings also show a negative statistically significant relationship between being lowly educated (no schooling and primary) and all measures of subjective well-being apart from safety/security in neighbourhood, relative to higher levels of education. The negative effects hover around 3% across measures of well-being and crimes. Being disabled tends to reduce well-being. The negative effect is statistically significant and robust across all measures of well-being except satisfaction with safety/security in neighbourhood. Disabled individuals are less likely to be 'very satisfied' with life as whole, neighbourhood and standard of living by between 3% and 4% across measures of crime. This effect is somewhat comparable in magnitude to that of low education.

Unemployment and low household income tend to reduce satisfaction across all measures of subjective well-being. Intuitively, there is a positive relationship between income and all measures of subjective well-being. The unemployed and those living in households with lower levels of income (relative to those in households with a monthly income above 1601) are less likely to be satisfied with their life as a whole (by 5–5.8%), neighbourhood (by 3–4%), standard of living (by 5–5.8%), and neighbourhood safety/security (1.8–2.4%). Taken together, unemployment and low household income tend to have relatively smaller negative effects on well-being compared to perceptions of 'very unsafe' day, night and home safety.

Although with some variation in terms of statistical significance, results generally indicate that individuals in larger household sizes tend to have lower levels of subjective well-being as proxied by satisfaction with safety/security in neighbourhood. Lastly satisfaction with life as a whole, neighbourhood and standard of living was lower in 2011 compared to 2015 while the reverse was the case for satisfaction with safety or security in the neighbourhood.

Gender and Subjective Well-Being

Table 5 allows us to discuss whether the effect of crime on life satisfaction is the same for men and women. The results for the female dummy and its interactions with crimes show that men and women tend to have a statistically similar effect of crime on life satisfaction, except for perception of day safety in their neighbourhood. Outcomes for model III in Table 5 suggest that women are more satisfied across the different spectrums of life than men. However, this result changes when we consider their safety perceptions when walking in their area of residence during day. Women's satisfaction with life as a whole, neighbourhood, standard of living and neighbourhood safety/security is less than men's by 6.8%, 9.2%, 5.9% and 4.7% respectively. This result is difficult to understand as we expected it in the case of night unsafety as more perilous activities happen then. For home safety we can rationalise the similar gender effect on life satisfaction as women would be around other household members which may absorb their safety concerns.

Discussion

In 1994, the post-Apartheid South African government inherited an economy replete with social evils such as high levels of unemployment, poverty, inequality and crime. This legacy worryingly still has damaging effects on the majority of citizens' well-being two and half decades post-Apartheid. Hence, the government has always been undertaking wide-sweeping measures to solve these problems – with limited success. Contemporaneously, researchers have been enhancing policy makers and other stakeholders' understanding of these problems. However, to date much literature has focused on unemployment, poverty and inequality rather than crime. This is partly due to scarcity of crime data in South Africa. Hence, this study has undertaken to advance literature on crime and well-being in South Africa; which is crucial for socio-economic development. Particularly the study examines the effect of crime on subjective well-being among Gauteng residents. The study estimates pooled ordered probit models utilising 2011 and 2015 data from two sources; the QoL survey conducted by the Gauteng City Region Observatory and the Institute of Security Studies (ISS) Crime Hub database. The analysis is based on four subjective well-being measures (i.e., satisfaction with one's life as a whole, satisfaction with one's neighbourhood of residence, satisfaction with one's standards of living, and satisfaction with the safety/security provided by the government in

the neighbourhood of residence) and five crime-related measures (i.e., crime rate, being a victim of crime, day, night and safety perceptions).

In line with psychology literature, this study established that crime is negatively associated with well-being, although we did not delve deep into the actual transmission process. This finding also resonates with both international and local studies on the topic (Powdthavee 2005; Møller 2005; Michalos and Zumbo 2000; Nopo, 2008; Kuroki 2013). This implies that crime fighting should continue to be an overarching goal in Gauteng Province, especially given its strategic position in South Africa and on the African continent. We also found that crime victimization has a larger negative effect on well-being when compared with a neighbourhood's crime rate (measured as the number of total contact crimes per 10,000 people in a respondent's residential area). An actual experience of crime seems to cause more psychological distress compared to general habitation in a crime zone. This calls for strategies to address psychological trauma among crime victims and even more importantly those that deter the onset of crime to begin with. Perceptions of being very unsafe at home and when walking in one's area during the day and at night were found to outweigh crime victimisation when it comes to reducing life satisfaction. This finding harmonises with Møller (2005) for NMMM which suggests that discomfort and uncertainty associated with feelings of vulnerability at supposedly places of personal comfort and safety seemed to cause more distress than being a victim of crime. This outcome champions for strategies to rid residential areas of crime round the clock accompanied by swift professional responses to crime; especially at night.

The results also showed that perceptions of unsafety when walking in one's neighbourhood and at home have a relatively larger negative effect on Gauteng residents' well-being when compared to economic indicators such as unemployment and low household income. This is contrary to Møller's (2005) finding for NMMM, which underscores the importance of not generalising results from regional specific studies. It, however, suggests that providing and maintaining safety in residential areas should rank high in the Gauteng Provincial government's post-Apartheid socio-economic developmental agenda. Moreover, individuals who are more likely to be economically vulnerable, Africans, the disabled and lowly educated are less likely to be satisfied with life compared to their better off counterparts. Hence addressing their endowments and socio-economic challenges is pertinent for improving well-being in Gauteng province. Importantly, the analysis also showed that the effect of crime on life satisfaction is largely the same for men and women. The peculiar case is when women exhibited less life satisfaction than men due to individual feelings of being 'very unsafe' to walk in a neighbourhood during the day. This inequity echoes the importance of improving neighbourhood safety in order to improve women's well-being. However, that this finding does not extend to night safety is difficult to rationalise within the current methodological framework, which warrantees a different investigation. This study has also gone beyond previous literature to show that life satisfaction in Gauteng was relatively lower in 2011 than in 2015. This is a commendable development which is however negated

by discontentment associated with neighbourhood insecurity echoing with the above discussion.

Conclusion

This study set out to investigate the relationship between crime and subjective well-being in Gauteng Province of South Africa. Understanding this relationship is important for assessing social well-being yet currently it has received little attention among developing country scholars at large and South African ones in particular. The few available South African studies are with limitations; they are in some cases outdated, focus on a narrow measure of subjective well-being (by only focusing on living conditions) or are confined to one specific region making them difficult to generalise to other regions. Hence this study extends the literature by examining a broad set of subjective well-being measures and exploring an previously unstudied region.

The key finding of this study is that crime has a negative effect on subjective well-being. Strong effects were identified for crime victimization on all subjective well-being measures while weak and statistically insignificant effects were identified when a broader measure of crime is used i.e., the neighbourhood crime rate. The study also uncovers the importance of crime perceptions (i.e., perceived safety during the day, night and at home) in influencing subjective well-being. We find that as feelings of safety deteriorate subjective well-being tends to diminish concomitantly. Møller 2005's study reports similar findings on safety perceptions in the Nelson Mandela Metropolitan. Markedly, while the crime rate and percentage of crime victimization has registered some declines - the results of this study indicate that crime still plays an important role in shaping people's subjective well-being in the Gauteng province. Overall these results call for policies that reduce people's exposure to crime and enhance their sense of safety within their neighbourhoods. The study has also shown that the well-being of Gauteng residents has improved when comparing 2011 and 2015, which is a positive development that should be celebrated by measures to perpetuate the outcome.

Admittedly, this study is not without limitations. First, the study only focuses on the Gauteng province. It would be ideal to conduct a more disaggregated analysis across all other South African provinces to identify regularities across regions. This, unfortunately, is not possible due to data constraints. Second, the study only controls for individual observed characteristics due to the cross sectional nature of the dataset. We are also unable to exploit instrumental variable techniques to address the problem of endogeneity due to data constraints. Further studies could benefit from sizeable and more comprehensive panel datasets.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have adhered to ethical standards and have no conflict of interest.

Appendix

Table 6 Definition of key variables

Variable	Definition
Outcome variables	
Satisfaction with life as a whole	Measured on a 5 point scale, measures how satisfied the respondent feels about their life as a whole = 1 if very dissatisfied and = 5 if very satisfied.
Satisfaction with neighbourhood/area	Measured on a 5 point scale: =1 if respondent feels very dissatisfied and = 5 if respondent feels very satisfied with the neighbourhood in which they reside.
Satisfaction with standard of living	Measured on a 5 point scale: =1 if respondent feels very dissatisfied with their current standard of living and = 5 if respondent feels very satisfied.
Satisfaction with safety and security	Measured on a 5 point scale; =1 if respondent is very dissatisfied and = 5 if respondent is very satisfied with the safety and security services provided by government where the respondent resides.
Key control variable	
Crime rate	Number of reported total contact crimes per 10,000 people in a given suburb.
Crime victim	Dummy = 1 if individual has been a victim of crime in the past 12 months, =0 otherwise.
Day Safety	Measured on a 5 point scale: = 1 if respondent feels very safe and = 5 if respondent feels very unsafe walking in their area during the day.
Night safety	Measured on a 5 point scale: = 1 if respondent feels very safe and = 5 if respondent feels very unsafe walking in their area during at night.
Home Safety	Measured on a 5 point scale: = 1 if respondent feels very safe at home and = 5 if respondent feels very unsafe at home.
Other covariates:	
Age	Age in years.
Female	Dummy = 1 if respondent is female, =0 otherwise.
African	Dummy = 1 if respondent is African, =0 otherwise.
Low education	Dummy = 1 if respondent has no schooling/primary education, =0 otherwise.
Unemployed	Dummy =1 if respondent is unemployed and 0 otherwise.
Low household income	Dummy = 1 if total monthly household income is R0–1601 and 0 otherwise
Disability status	Dummy =1 if the respondent has a disability and = 0 otherwise
Household size	Number of household members.
Year - 2011	Dummy = 1 if year of survey is 2011 and = 0 if year of survey is 2015

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