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The Relationship between Crime and Life Satisfaction: Evidence from the Gauteng Province

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Abstract

The present study adds to the rather limited literature on crime and subjective well-being in South Africa by analysing data from the Gauteng Province for the years 2011 and 2015. Using various measures of life satisfaction, this study seeks to answer the following research questions for the Gauteng Province: *'Does crime have an impact on life satisfaction?'* and *'How has the relationship between crime and life satisfaction evolved between 2011 and 2015?'* To answer these questions the study estimates an ordered probit model utilizing data from two sources, namely the Quality of Life Survey (QoL survey) conducted by the Gauteng City Region Observatory (GCRO) and the Institute of Security Studies (ISS) Crime Hub. The estimates are 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) which were regressed against five crime-related measures (i.e., crime rate, being a victim of crime, day, night and safety perceptions at home). The key findings of this study are 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 was used i.e., the crime rate in the neighbourhood of residence. The study also uncovers the importance of perceived safety during the day, night and at home in determining the well-being of Gauteng residents. As feelings of safety deteriorate (i.e., move from fairly safe to very unsafe) subjective well-being tends to reduce as well. This result is generally consistent across all measures of well-being used for both 2011 and 2015. Notably, while the crime rate and percentage of crime victimization has registered some declines the results of this study indicate that crime still plays a very important role in shaping people's subjective well-being in the Gauteng province.

1. Introduction

A vast number of studies exist, both internationally and locally, that examine the determinants of life satisfaction (otherwise referred to as subjective well-being). Previous studies have examined for instance the link between life satisfaction and health, education, employment status, income, occupation and family structure (e.g., Steptoe, Deaton & Stone, 2015; Castriota, 2007; Easterlin, 2001; Frame, 2013; Posel & Casale. 2011; Posel, 2014; Clark, Georgellis, Lucas & Diener, 2004; Alston & Dudley, 1973; Botha & Booysen, 2014). Conversely, there are relatively few studies that examine the link between crime and life satisfaction, even in countries where crime rates are high like South Africa. Yet, understanding this relationship is fundamental for any assessment of social well-being given that exposure to crime has long lasting effects such as negative psychological effects, low work productivity and high insurance premiums (Powdthavee, 2005). The lack of studies in this area is possibly due to data constraints, particularly when it comes to crime data. Of the limited studies that exist, Davies and Hinks (2010) examine Malawian data for 2005 and find that crime has a negative effect on happiness. Men and women were found to react differently to different criminal activities; while only feelings of insecurity had a negative effect on happiness among women, violent attacks had a negative effect on males (Davies & Hinks, 2010). In another study Sulemana (2015) utilizes data for 20 African countries (South Africa included) for the year 2008 and found that theft, physical assault and crime-related fear all negatively influenced subjective wellbeing.

The scarcity of studies on the effect of crime on subjective well-being is also evident in the case of South Africa where this issue has not been explored at length. To the best of my knowledge, only Powdthavee (2005), Møller (2005) and Sulemana (2015) have investigated this issue for South Africa. Powdthavee (2005) examines the 1997 October Household Survey (OHS) and found that non-victims of crime report significantly higher levels of well-being than victims; although non-victims residing in high crime regions tend to report lower levels of happiness than non-victims residing in low crime regions. Møller (2005), for the Nelson Mandela Metropolitan (NMMM), found 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. Also, crimes against an individual were found to have a larger negative effect on feelings of safety and well-being than property crimes. Results found by Sulemana's (2015) cross country study also confirms that crime is negatively associated with life satisfaction in South Africa.

The aforementioned studies on South Africa are quite informative; however, they are not without limitations. This leaves room for additional studies which forms the motivation behind this current study. Powdthavee's (2005) study utilises data in the 1990s which is somewhat outdated and requires updating. Although Sulemana's (2015) study employs a recent dataset by making use of data from the Round 4 of the Afrobarometer Survey (used in 2008 to interview approximately 27713 people in 20 Sub-Saharan African countries); it utilises a rather narrow measure of subjective well-being, which focuses only on an individual's living conditions[1]. This measure is limited as it is too specific. Also, Sulemana (2015) presents a country level picture, however given the substantial spatial heterogeneities characterising South Africa's socio-economic landscape, disaggregated studies are required to uncover heterogeneities which might be masked by aggregated studies. Specifically, provinces across South Africa are not all equally developed, nor do they suffer the same crime rates, or have had the same level of government investment. Møller's (2005) study focuses on the NMMM, thus providing a disaggregated analysis. However, as mentioned earlier spatial heterogeneity makes Møller's findings difficult to generalize to other localities, such as Gauteng. Consequently, a series of disaggregated studies are required to shed more light on the implications of crime on the quality of life in South Africa. The present study adds to this rather limited literature in South Africa by analysing data from the Gauteng Province for the years 2011 and 2015. Using various measures of life satisfaction, this study seeks to answer the following research questions for the Gauteng Province:

'Does crime have an impact on life satisfaction?'

'How has the relationship between crime and life satisfaction evolved between 2011 and 2015?'

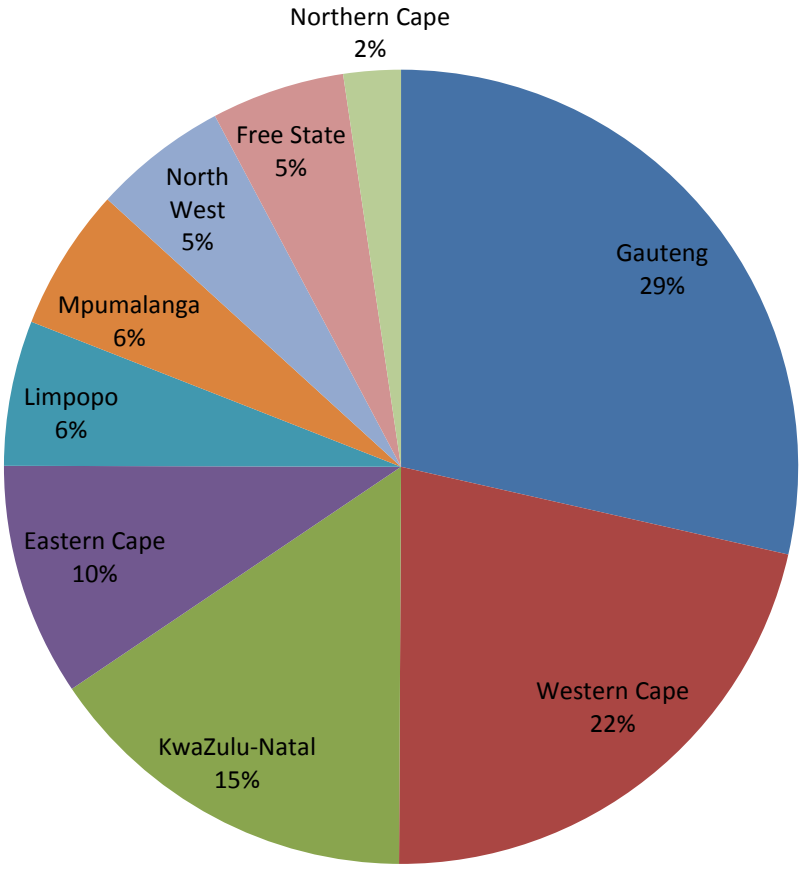
In view of the fact that crime is a social problem, it is **hypothesized** that crime has a negative impact on the quality of life. In other words, residing in a suburb with a high (low) crime rate is associated with low (high) levels of life satisfaction. It is also **hypothesized** that the relationship between crime and life satisfaction has remained constant over time, i.e. that crime would continue to negatively impact life satisfaction over time.

While a province by province study would be ideal for a more disaggregated picture for the entire country, the present study is limited to the Gauteng province due to data constraints. Data containing various measures of life satisfaction and a significant sample of individuals across suburbs is only available for the Gauteng province in the Quality of Life Survey (QoL survey) conducted by the Gauteng City Region Observatory (GCRO). This can be considered as a drawback as it makes the

[1] Respondents are asked "In general, how would you describe your own present living conditions".

study less generalizable to other provinces, however it can also be viewed as an advantage; it allows for a more focused analysis which does not lump together heterogeneities across South Africa's provinces. In addition the Gauteng province is an interesting area of study in its own right. Though it only occupies 1.4% of South Africa's land mass, it is the country's economic hub producing 35% of the country's total output[2] and contributes around 7% towards Africa's GDP (Molokwane, 2014). Also as indicated in Figure 1, relative to other provinces, Gauteng has the highest crime rates in South Africa. Accordingly, this study contributes to the existing literature by providing a disaggregated analysis while utilising various life satisfaction measures unlike previous studies for the most affected province - Gauteng.

Figure 1: 2017 Total crimes by Province



Source: Crime Stats SA

[2] 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).

While previous South African studies are static (i.e., examine one point in time), the present study also utilises data for two periods, 2011 and 2015, to map out changes in the relationship between crime and life satisfaction over-time.

2. Background: Crime and life satisfaction in South Africa

South Africa is considered to be one of "the most violent and unsafe countries in the World"; it ranks as the 15th worst country regarding security and safety; and the 8th most violent country in the world (Business Tech, 2015). In comparison to other BRICS countries, South Africa is considered to have the highest crime levels. Whilst South Africa's crime levels are ranked 6th worst in the world, Brazil is ranked 10th, Russia is ranked 35th, India is ranked 45th and China is ranked 83rd (Nation Master, 2017).

South Africa's high crime rates have been 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. Characterized by gross violations 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 (Glucksmann, 2010). 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.

Notably, available statistics tends to indicate that crime levels within 'White' neighbourhoods during apartheid was significantly lower than crime levels in 'non-white' neighbourhoods; possibly due to the biased nature of policing during this period. The lack of specific research and or information on crime levels within 'white' neighbourhoods makes it difficult to provide a detailed comparison across racial profiles. This inevitably locks crime to be a 'black' phenomenon – issue that requires further research and clarification.

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 1990-94 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 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 (Crime Stats SA, 2017). 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 with most aspects of life; and Indian/Asian and Coloureds' satisfaction with most aspects of life lay somewhere in between (Møller, 2001). Also as expected South Africans who were subject to poorer living conditions were also found to be less satisfied with both their lives and living domains (Møller, 2001). For a fleeting moment in 1994 most South Africans reported being satisfied with life, but five 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 is an indicator of the continued existence of the 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). However, recent studies have pointed toward white and black levels of subjective well-being beginning to converge (Møller, 2001).

More recent estimates indicate that South Africa is generally characterized with low levels of happiness. According to the United Nation's 2016 World Happiness report South Africa was ranked 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[3]; South Africa ranks 31st, India ranks 46th, Brazil ranks 58th, China ranks 61st and Russia ranks 67th (Nation Master, 2017). Unfortunately, it is unclear as to what leading factors contributed to South Africa's fall from position 113 to 116, nor is it clear what role of crime plays in this measure of happiness for South Africa or other BRIC countries. This limitation provides a potential area for improvement in further studies.

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 & Veenhoven, 2015). Notably, happiness in South Africa has been reported to be on the rise in the past 10 years (Rothmann & Veenhoven, 2015). 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.

[3] Nation master's quality of life measure is defined as the following: 'Quality of Life Index is an estimation of overall quality of life by using empirical formula (the formula is an opinion and is based on experiments). The actual formula might be changed. Currently, we put the highest weight on pollution - if the environment is polluted too much, the economy or safety cannot fulfil it. We put the second highest importance to safety, since it is more important to feel safe rather than wealthy, in our opinion etc. The number 65 is added so that the numbers are in such range so it rarely goes under zero (65 is a range modifier)'.

3. Theoretical Framework and Review of Empirical Studies.

3.1 Theoretical Framework

Recently social scientists and policy makers have become increasingly 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 & 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).

Regardless of this recent interest in happiness there are two psychological theories of happiness (i.e. 'set point' and 'comparison' theory) which suggest that happiness cannot be raised indefinitely; implying that happiness does not hold much value. Specifically, 'set-point' theory posits that people are 'mentally programmed for a certain degree of happiness' regardless of life circumstances. This is underpinned by the notion that people have a given level of happiness determined by their personal traits, genetics, cultural aspects and homeostatic maintenance[4]. Various life events (e.g., employment, marriage, divorce and death of loved ones) have the tendency to push a person's level of happiness above or below their 'set-point', but over time hedonic adaptation tends to return happiness levels to the initial set-point level (Frederick & Loewenstein , 1999). Implications of this theory are that policies aimed at improving socio-economic conditions will only have temporary effects on happiness; this is due to the tendency for people to revert back to their original happiness levels (Lucas, Clark, & Yannis, 2003). Accordingly, this theory implies that individual, as well as public policy attempts will be ineffective in improving well-being in the long run.

Comparison theory 'sees evaluation rather as a continuous judgment process involving the comparison of perceptions of life-as-it-is with notions of how-life-should be' (Veenhoven, 2009:2). This theory posits that people hold standards about what they feel is a good life; so they constantly weigh these standards against the reality of their lives. Standards can differ across life-time comparisons (whereby people compare if their lives are better than before); social comparisons (how well people are doing relative to others); social construction (standards are often seen as an outcome of socialization whereby people adopt cultural and historical ideas about what a good life

[4] A term which maintains that just as we keep our body temperatures at a certain degree, we also unconsciously keep our mental happiness at a certain level (Veenhoven, 2009).

entails); and reflected appraisal (not only do we compare our lives according to our own standards, but we also evaluate our lives through the eyes of others. i.e., how happy do others think we are) (Veenhoven, 2009). To a lesser extent than set-point theory, comparison theory also implies that there is little value to happiness and the ability to raise happiness indefinitely is unlikely (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, Stutzer, Benz, Meier, Luechinger, & Benesch, 2008). Unlike in aforementioned psychological theories, 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 is underpinned by the notion of "more is better" (Frey & Stutzer, 2002). Under 'revealed preference' an individual's preference of one bundle of goods over another affordable bundle is indicative of the person being better off with the selected bundle (Bruni & Porta, 2005). The implication of this theory is that individuals can improve their levels of satisfaction by having access to higher incomes; therefore public policies in economics have aimed at increasing income/economic growth so as to raise overall well-being (Bruni & 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 & Stutzer, 2002; Bruni & Porta, 2005).

3.2 Review of Empirical Studies

Empirical evidence does not seem to support the notion that people do not always completely adapt to socio-economic changes suggested by the comparison and set-point theories. In fact several major life events result in permanent changes in life satisfaction such as: the dissolution of marriages, job losses or health shocks; contrasting what is suggested by comparison and set-point theory (Frederick and Loewemstein, 1999; Blanchflower and Oswald, 2004; Lucas et al., 2003; Frey and Stutzer, 2002; Diener, Lucas and Scollon, 2006)[5]. Also, empirical evidence finds little support for the comparison theory (see Kasser & Ryan, 1993).

[5] There is evidence that a long-run assessment of individuals reveals that there is considerable movement along the happiness ladder in a modern society. Veenhoven (2009) projected that over a lifetime only around 30 percent of the initial rank order in happiness will have remained. Further,

Regarding the 'economic theory of happiness', Easterlin's (1974) seminal work casts doubt on its validity. It has been shown that economic prosperity does not necessarily make people happier; on average self-reported happiness seems to be the same across poor and rich countries and that a rise in economic growth does not raise happiness (Easterlin, 1974). The main implication of Easterlin's paradox is that the main objective functions that policy makers should aim to maximize is happiness rather than consumption, income or economic growth. Easterlin's (1974) paradox prompted many researchers to consider other factors (e.g. health, education, religion, family structure, labour market status, crime and corruption etc.) beyond economic growth or income which influence well-being (see Davies and Hinks, 2010; Di Tella and Schargrodsky, 2009; Di Tella, et al., 2008; Shedler, Mayman and Manis, 1993; Sutton and Davidson, 1997).

In view of the Easterlin paradox, this study adds to the extant literature which seeks to understand the impact of non-economic factors associated with subjective well-being. In particular, the present study focuses on the link between crime and happiness – an area which has received relatively less attention, especially in developing countries.

In the international arena, a number of studies examine the link between crime and happiness. For instance, Cornaglia, Feldman and Leigh (2014) for Australia, Cheng and Smyth (2015) for China; Di Tella, MacCulloch and Nopo (2008) for Latin America; Di Tella and Schargrodsky (2009) for Argentina; Michalos and Zumbo (2000) for British Columbia; Cohen (2008) for the US; 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, studies on the relationship between crime and happiness are still very limited; a thorough search of the literature yields only two 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, their study found that men and women tend to react differently to different criminal activities: specifically 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 relationship between crime and

average happiness levels at a national level have been shown to have gradually risen over the past 30 years; whilst in other countries there have been sudden falls in happiness e.g. the 'Rubel crisis' in Russia (Veenhoven & Hagerty, 2006).

happiness. In particular happiness is at its lowest in a neighbourhood when 11.2 percent of the neighbourhood's residents have reported having been victimized (Davies & Hinks, 2010). In another study, Sulemana (2015) examines data from the 4th round of the Afrobarometer Survey (conducted in 20 African countries). His findings confirmed those of previous studies, showing that theft, physical assault and crime-related fear all negatively influenced subjective wellbeing. From a gender perspective, women showed a significant relationship with wellbeing when it came to crime-related-fear as well as theft, but neither of these had an impact on the wellbeing of men. The study also found that physical assault had a significant negative effect on wellbeing for both genders (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), using the 1997 Household survey shows that non-victims report significantly higher levels of well-being than victims (*ceteris paribus*); although non-victims living in high crime regions do tend to report lower levels of happiness than non-victims living in low crime regions. The second study by Møller (2005) examines data from the Eastern Cape Province's Nelson Mandela Metropolitan Municipality (NMMM). This study found that variables such as "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 the crime; while crimes against an individual had a larger negative effect on feelings of safety and wellbeing, than property crimes.

Based on this review of the extant literature, 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 data from the Gauteng province.

4. Methodology and data

4.1 Methodology

There are two main approaches often used in studies of life satisfaction; objective and subjective approaches. The objective approach analyses objective measures of what contributes towards a

good life such as income, wealth, housing and jobs (Alatartseva & Barysheva, 2015). The subjective approach analyses an individual's subjective evaluations of their own lives. Subjective measures are based on a person's self-report, and they commonly include questions about whether people feel content with their lives as a whole; also included is a range of daily emotions such as sadness, depression, worry and happiness and other aspects such as health, social connections, education, and personal safety (Alatartseva & Barysheva, 2015). While considerable explorations have been conducted using the objective approach, the present study adopts the subjective approach which captures aspects of life (e.g., emotional state and feelings) that objective measures fail to capture explicitly.

The analysis will make use of a multivariate analysis. Specifically, the study estimates a life satisfaction function using an ordered probit model for 2011 and 2015. The ordered multiple choice model for the latent variable y_i^* is specified as:

$$y_i^* = x_i'\beta + \gamma \text{crime}_i + u_i \,,$$

$$y_i = j \text{ if } \alpha_{j-1} < y_i^* \leq \alpha_j \qquad (1)$$

where y_i is individual *i*'s measure of subjective well-being with values j : 1 (very dissatisfied) to 5 (very satisfied). Various measures will be utilized for life satisfaction including life satisfaction in general, measures specifically related to satisfaction with neighbourhoods, satisfaction with the safety/security provided by the government in one's neighbourhood (taken as a proxy for satisfaction with policing) 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. Also, crime victimization and fear of crime will be used 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 general 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 equation (1), β and γ are parameters to be estimated and u_i is the error term. The coefficient of interest γ measures the effect of crime on life satisfaction.

The probability that individual *i* selects alternative *j* in the life satisfaction responses is:

$$P_{ij} = P(y_i = j) = P(\alpha_{j-1} < y_i^* \leq \alpha_j)$$
$$= \Phi(\alpha_j - x_i'\beta - \gamma \text{crime}_i) - \Phi(\alpha_{j-1} - x_i'\beta - \gamma \text{crime}_i) \quad j = 2, \ldots j\text{-}1. \qquad (2)$$

where Φ is the cumulative standard normal distribution function. This is estimated using the method of maximum likelihood. 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. These omitted variables could include, but are not limited to, social capital, a proxy related to community participation and satisfaction with neighbourhood amenities such as transport. For instance, a respondent who is a part of a community watch may experience reductions in crime incidents in their neighbourhood, whilst having a community's support or lack thereof can also affect one's subjective well-being. Likewise, lack of public transit or satisfaction herewith in one's neighbourhood may cause respondents who have to walk (or respondents who feel unsafe to utilize their transport) to be higher crime targets, whilst general satisfaction with transport in one's neighbourhood can increase a respondent's satisfaction by providing peach of mind. Excluding relevant variables can result in biased coefficients, as reported values are systematically lower or higher than actual values due to the omitted variable bias. The second source is reverse causality. In this case crime may cause people to be less happy while people who are unsatisfied with life may resort to crime. Hence, the size effect of crime of life satisfaction may be larger or smaller than is observed in reality. Panel data models as well as instrumental variable techniques are ideal for solving this problem. Unfortunately, the present study is unable to deal with the endogeneity 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.

4.2 Data

This study utilizes data drawn from two sources. The first data 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 victimization and crime perceptions. The 2011 and 2015 surveys collects information on 16,729 and 30,002 respondents, respectively (Götz, Jennings, & Culwick, 2016). 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 (ISS Crime Hub, 2017). In the GCRO data we observe the suburbs in which an individual resides, and in the Crime Hub data we observe the total number of crimes which have occurred within a suburb. Therefore the two datasets from GCRO and Crime Hub are merged 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 break down life satisfaction into specific components like satisfaction with conditions of living, neighbourhoods and police services which the QoL does (National Income Dynamics Study, 2017). 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. Table A.1 in the Appendix presents a detailed description of the key variables used in the present analysis.

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, safety and security as well as relevant demographic, socio-economic and crime variables as described in Table A.1 in the Appendix. The sample was further restricted to individuals aged 18 years and above. This sample cleaning process leaves 8,536 and 19,623 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 normalized to account for population differences across suburbs by calculating the crime rate i.e., crimes per 10,000 people as follows:

$$\text{crime rate} = \frac{number\ of\ reported\ crimes}{total\ population} = result\ \times\ 10{,}000$$

Table 1 presents 2011 and 2015 descriptive statistics for the key variables.

Table 1: Descriptive statistics

		2011		2015	
		Mean	**SD.**	**Mean**	**SD.**
Subjective well-being					
Satisfaction: Life		3.393	1.150	3.596	1.106
	Neighbourhood	3.499	1.053	3.622	1.075
	Standard of living	3.205	1.154	3.466	1.170
	Safety	3.064	1.264	2.883	1.212
Crime measures					
Crimes per 10,000 people		562.0	4630.2	484.9	3004.6
Victim of crime		0.230	0.421	0.205	0.404
Day Safety:	Very safe	0.317	0.465	0.279	0.448
	Fairly safe	0.469	0.499	0.426	0.494
	Neither	0.067	0.251	0.090	0.286
	Bit unsafe	0.083	0.276	0.137	0.344
	Very unsafe	0.063	0.244	0.069	0.254
Night Safety:	Very safe	0.075	0.263	0.066	0.249
	Fairly safe	0.201	0.401	0.195	0.396
	Neither	0.093	0.290	0.098	0.297
	Bit unsafe	0.258	0.437	0.245	0.430
	Very unsafe	0.374	0.484	0.397	0.489
Home Safety:	Very safe	0.317	0.465	0.343	0.475
	Fairly safe	0.402	0.490	0.380	0.485
	Neither	0.110	0.313	0.089	0.285
	Bit unsafe	0.100	0.300	0.114	0.317
	Very unsafe	0.070	0.256	0.074	0.263
Demographics					
Age		41.53	16.30	39.81	15.17
Female		0.572	0.495	0.536	0.499
Male		0.428	0.495	0.464	0.499
African		0.829	0.377	0.847	0.360
Coloured		0.029	0.168	0.040	0.196
Indian/Asian		0.027	0.162	0.018	0.134
White		0.115	0.319	0.095	0.293

No schooling	0.039	0.193	0.018	0.135
Primary	0.153	0.360	0.124	0.329
Incomplete secondary	0.349	0.477	0.317	0.465
Matric	0.278	0.448	0.333	0.471
Tertiary	0.181	0.385	0.208	0.406
Unemployed and 'other'	0.660	0.474	0.519	0.500
Disabled	0.075	0.264	0.062	0.242
Household size	3.916	2.209	3.648	2.496
Household income: R0-800	0.219	0.413	0.168	0.374
R801-1600	0.173	0.378	0.164	0.370
R1601-R3200	0.201	0.401	0.202	0.402
R3201-R6400	0.151	0.358	0.174	0.379
R6401-25600	0.188	0.391	0.218	0.413
R25601-51200	0.045	0.207	0.052	0.221
R51201-more	0.023	0.149	0.022	0.147
Number of observations	8,536		19,623	

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/security which registered a decline. Pertaining to crimes, statistics show a general decrease in total crime rates between 2011 and 2015. On average, 562 total contact crimes per 10,000 were recorded in 2011 compared to 485 total contact crimes per 10,000 people recorded in 2015. Consistent with this finding is the 3% point decline in the share of victims of crime in the same period. Regarding safety when walking around one's area during the day, most respondents (47%) reported being 'fairly safe', followed by 32% of respondents who reported being 'very safe' in 2011. These results were mirrored in 2015 statistics. In contrast for safety when walking around their area at night, most respondents in 2011 (37%) and 2015 (40%) felt 'very unsafe'. Finally, for safety at home about 7% of the respondents felt 'very unsafe' in both 2011 and 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 (57% in 2011 and 54% in 2015) with an average age in the range 40-42 years. Consistent with the country's racial profile, Africans account for over 80% of the sample while India/Asians account for about 2%. In terms of the education distribution, it is observed that respondents are clustered in the incomplete secondary category followed by matric and then tertiary education. Over time there is a general increase in Gauteng's human capital; a decrease in the lower part of the education distribution (i.e., no schooling and primary education) while there is an increase in the upper tail of

the distribution (i.e., tertiary education). In both periods most respondents were unemployed or economically inactive[6] (referring to respondents who reported being in the 'other' category of employment), although this figure declined in 2015 by 14% points. In addition, between 6-7% of the respondents reported to have had some form of disability. Household size has remained fairly stable over time at 4 members on average. Finally, between 2011 and 2015, the share of households in the last two lower income categories (i.e., R0-800 and R801-1600 per month) decreased while the opposite is observed for households with income ranging between R3,201 - 51,200 per month.

5. Empirical results

This section presents results (coefficient, marginal effects and corresponding standard errors) obtained from the ordered probit model i.e., the impact of crime on subjective well-being (as measured by life satisfaction as a whole, satisfaction with neighbourhood, standard of living and safety/security). Table 2 presents results of the impact of the crime rate (i.e., contact crimes per 10,000 people) on the various measures of subjective well-being while Table 3 presents results when crime is measured by crime victimization (i.e., 'being a victim of crime'). Respectively, tables 4, 5 and 6 present estimates of the effect of perceived day, night and home safety on subjective well-being. All models control for age, age-squared, race dummies, level of education, disability status, household income dummies and household size.

5.1 Crime rate

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 subjective well-being (i.e., life as a whole, satisfaction with the residential neighbourhood, standard of living and safety/security that the government provides in their neighbourhood). Results for 2011 indicate that crime has a negative but statistically insignificant effect on satisfaction with life as a whole, neighbourhood, the standard of living and satisfaction with safety/security.

Table 2: Effect of number of crimes per 10,000 on life satisfaction for 2011 & 2015

[6] Individuals who are economically inactive are all people of either gender who were neither employed or unemployed during the period of study. In the GCRO QoL survey these individuals were categorized as being in the 'other' category of employment, thus accounting for the seemingly high unemployment summary statistic values form 2011 and 2015.

		Very dissatisfied	dissatisfied	Neither	Satisfied	Very satisfied
Satisfaction with:	Coef.	Marginal effects				
Panel A: 2011						
Life as a whole	-0.011	0.002	0.002	0.001	-0.002	-0.002
	(0.011)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
Neighbourhood	0.001	0.000	0.000	0.000	0.000	0.000
	(0.011)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
Standard of Living	-0.004	0.001	0.001	0.000	-0.001	-0.001
	(0.011)	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)
Safety/security	-0.001	0.000	0.000	0.000	0.000	0.000
	(0.011)	(0.002)	(0.002)	(0.000)	(0.003)	(0.002)
Panel B: 2015						
Life as a whole	-0.010***	0.001***	0.002***	0.001***	-0.001***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Neighbourhood	-0.033***	0.003***	0.005***	0.003***	-0.003***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Standard of Living	-0.0234***	0.003***	0.005***	0.002***	-0.003***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Safety/security	0.037***	-0.009***	0.006***	0.000***	0.009***	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. All models control for age, age-squared, race dummies, level of education, disability status, household income dummies & household size.

In contrast, statistically significant effects are observed in the 2015 data where total contact crimes have a negative effect on all measures of subjective well-being. Notably, these differences in results between 2011 and 2015 are difficult to rationalise. Focusing on the significant results, the marginal effects in Panel B of Table 2 indicate that as the crime rate increases, individuals are more likely to report being 'very dissatisfied' or 'dissatisfied' across all measures of subjective well-being. This result is consistent with the reduced probability of reporting being 'satisfied' and 'very satisfied' across all measures of well-being as crime rate increases; the exception being effects on satisfaction with security/safety which appear counterintuitive. A possible explanation for this opposing finding is that this finding can be interpreted as a relative measure. For instance, if respondents felt more satisfied with the safety/security provided in their neighbourhood in 2015 relative to in 2011, then despite the higher crime rate in 2015; they felt less likely to be targets of crime in this period due to relatively better safety/security measures in their neighbourhoods.

5.2 Crime victimization

Table 3 presents ordered probit estimates of the impact of being a victim of crime on various measures of 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 crime experiences. Thus using this measure assesses the impacts of first hand crime-experiences on subjective well-being. Compared with the effects uncovered when neighbourhood crime rates are used, the effects of first-hand crime experience are much stronger. As indicated by the coefficient, both the 2011 and 2015 results concur that being a victim of crime has negative statistically significant effects on all measures of well-being.

Examining closely the marginal effects, respondents are more likely to report lower categories of satisfaction (i.e., 'very dissatisfied' and 'dissatisfied') with their life as a whole, their neighbourhood, standard of living and safety/security provided by the government in their neighbourhood. The effect is strongest for safety/security (for both 2011 and 2015) followed by satisfaction with the standard of living (in 2011) and satisfaction with neighbourhood (in 2015). Mirroring these results is the reduced probability of reporting higher levels of satisfaction (i.e., 'very satisfied' and 'satisfied'). For instance, victims of crime are less likely to report being 'satisfied' ('very satisfied') with safety/security provided by government by 14% (7%) in 2011. The corresponding figures for 2015 are 9% (4%), respectively. For satisfaction with life as a whole, 2011 (2015) results suggest that being a victim of crime reduces the probability of reporting being satisfied/very satisfied by 3-4% (2-4%).

Table 3: Effect of being a victim of crime on life satisfaction for 2011 & 2015

		Marginal effects				
Satisfaction with:	Coef.	Very dissatisfied	dissatisfied	Neither	Satisfied	Very satisfied
Panel A: 2011						
Life as a whole	-0.180***	0.025***	0.032***	0.014***	-0.037***	-0.033***
	(0.028)	(0.004)	(0.005)	(0.002)	(0.006)	(0.005)
Neighbourhood	-0.207***	0.025***	0.035***	0.017***	-0.044***	-0.033***
	(0.029)	(0.004)	(0.005)	(0.002)	(0.007)	(0.004)
Standard of Living	-0.265***	0.040***	0.055***	0.010***	-0.072***	-0.034***
	(0.028)	(0.005)	(0.006)	(0.001)	(0.008)	(0.003)
Safety/security	-0.538***	0.140***	0.0687***	0.000703	-0.139***	-0.0709***
	(0.028)	(0.008)	(0.003)	(0.001)	(0.008)	(0.003)
Panel B:2015						
Life as a whole	-0.156***	0.017***	0.026***	0.015***	-0.019***	-0.039***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Neighbourhood	-0.178***	0.020***	0.028***	0.016***	-0.023***	-0.041***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Standard of Living	-0.168***	0.021***	0.033***	0.011***	-0.026***	-0.039***

	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Safety/security	-0.363***	0.094***	0.049***	-0.010***	-0.094***	-0.039***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: Standard errors in parentheses. *p < 0.10, ** p < 0.05, *** p < 0.01. All models control for age, age-squared, race dummies, level of education, disability status, household income dummies & household size.

Over-time, results show stronger marginal effects for 2011 relative to 2015 for dissatisfaction with life as a whole, neighbourhoods, standard of living and safety/security. This somewhat weakening effect is potentially indicative of the fact that crime victimization dropped by around 3% points between 2011 and 2015. Overall, crime victimization appears to have affected satisfaction with safety/security the most followed by satisfaction with standard of living compared to satisfaction with life as a whole and neighbourhood for both years.

5.3 Day, night & home safety results

Tables 4, 5 & 6 respectively present ordered probit estimates of the impact of day, night and home safety perceptions on subjective well-being. Unlike the previous measure which focuses on individuals who actually experienced crime, perceptions of crime incorporate everyone. Thus, results using this measure give a more general result on the impact of safety feelings (formed perhaps on the basis of actual or anticipated crime experiences) on subjective well-being. It is worth noting a potential criticism; the presence of subjective dependent and independent measures used in these regressions can mean that unobservable heterogeneities are possible (for example, generally pessimistic people may report lower values on all subjective measures thus biasing the results).

Day safety

Table 4 shows that feelings of safety when walking in own residential neighbourhood during the day has a statistically significant negative effect on all measures of subjective well-being. This is indicated by the negative, statistically significant coefficients for both 2011 and 2015. Marginal effects for 2011 suggest that individuals are about 3-4% more likely to report being 'very dissatisfied or dissatisfied' with life as a whole for those who feel 'fairly safe' relative to individuals who feel 'very safe' when walking in their neighbourhood during the day (i.e. the reference group). Also individuals who feel 'very unsafe' when walking in their neighbourhood during the day, are more likely to report being 'very dissatisfied or dissatisfied' with life as a whole by 10-12%; a difference of 7-8% points. Thus, as perceptions of safety deteriorate satisfaction with life as a whole also diminishes

considerably. This effect is also mirrored in the reductions in the probability of reporting higher levels of satisfaction with life as a whole i.e., 'very satisfied' and 'satisfied'.

Table 4: Effect of day safety perceptions on life satisfaction for 2011 & 2015

			Marginal effects				
Satisfaction with:		Coef	Very dissatisfied	dissatisfied	Neither	Satisfied	Very satisfied
Panel A: 2011							
Life as a whole	Day fairly safe	-0.206***	0.027***	0.036***	0.017***	-0.040***	-0.040***
		(0.027)	(0.004)	(0.005)	(0.002)	(0.005)	(0.005)
	Day neither safe	-0.203***	0.030***	0.036***	0.014***	-0.045***	-0.035***
		(0.050)	(0.008)	(0.009)	(0.003)	(0.012)	(0.008)
	Day bit unsafe	-0.310***	0.048***	0.054***	0.020***	-0.072***	-0.051***
		(0.046)	(0.009)	(0.008)	(0.002)	(0.012)	(0.006)
	Day very unsafe	-0.616***	0.115***	0.102***	0.024***	-0.158***	-0.084***
		(0.052)	(0.013)	(0.008)	(0.002)	(0.015)	(0.005)
Neighbourhood	Day fairly safe	-0.349***	0.038***	0.057***	0.031***	-0.070***	-0.057***
		(0.028)	(0.003)	(0.005)	(0.003)	(0.006)	(0.005)
	Day neither safe	-0.451***	0.066***	0.077***	0.031***	-0.116***	-0.057***
		(0.051)	(0.010)	(0.009)	(0.003)	(0.016)	(0.005)
	Day bit unsafe	-0.574***	0.089***	0.096***	0.036***	-0.153***	-0.069***
		(0.047)	(0.010)	(0.008)	(0.002)	(0.015)	(0.004)
	Day very unsafe	-0.684***	0.116***	0.113***	0.037***	-0.190***	-0.075***
		(0.053)	(0.013)	(0.008)	(0.002)	(0.017)	(0.004)
Standard of living	Day fairly safe	-0.129***	0.018***	0.027***	0.007***	-0.034***	-0.018***
		(0.027)	(0.004)	(0.006)	(0.001)	(0.007)	(0.004)
	Day neither safe	-0.198***	0.030***	0.042***	0.007***	-0.055***	-0.024***
		(0.050)	(0.009)	(0.010)	(0.001)	(0.015)	(0.005)
	Day bit unsafe	-0.234***	0.036***	0.049***	0.008***	-0.065***	-0.028***
		(0.046)	(0.008)	(0.009)	(0.001)	(0.013)	(0.005)
	Day very unsafe	-0.754***	0.157***	0.131***	-0.006	-0.218***	-0.064***
		(0.053)	(0.015)	(0.007)	(0.004)	(0.015)	(0.003)
Security /safety	Day fairly safe	-0.395***	0.086***	0.062***	0.008***	-0.099***	-0.057***
		(0.027)	(0.006)	(0.004)	(0.001)	(0.007)	(0.004)
	Day neither safe	-0.724***	0.208***	0.074***	-0.015***	-0.200***	-0.067***
		(0.050)	(0.018)	(0.003)	(0.003)	(0.014)	(0.003)
	Day bit unsafe	-0.859***	0.255***	0.078***	-0.022***	-0.235***	-0.076***
		(0.046)	(0.017)	(0.003)	(0.003)	(0.012)	(0.003)
	Day very unsafe	-1.528***	0.512***	0.020**	-0.075***	-0.365***	-0.091***
		(0.055)	(0.020)	(0.009)	(0.005)	(0.009)	(0.003)
Panel B: 2015							
Life as a whole	Day fairly safe	-0.211***	0.021***	0.035***	0.021***	-0.024***	-0.054***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day neither safe	-0.390***	0.050***	0.067***	0.033***	-0.063***	-0.086***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day bit unsafe	-0.383***	0.047***	0.065***	0.033***	-0.060***	-0.086***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day very unsafe	-0.565***	0.082***	0.096***	0.041***	-0.105***	-0.114***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Neighbourhood	Day fairly safe	-0.306***	0.031***	0.047***	0.029***	-0.036***	-0.072***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day neither safe	-0.423***	0.055***	0.068***	0.035***	-0.074***	-0.084***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day bit unsafe	-0.458***	0.059***	0.074***	0.038***	-0.078***	-0.092***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day very unsafe	-0.609***	0.091***	0.098***	0.043***	-0.122***	-0.110***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Standard of living	Day fairly safe	-0.207***	0.025***	0.040***	0.014***	-0.030***	-0.049***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day neither safe	-0.232***	0.031***	0.046***	0.014***	-0.040***	-0.050***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day bit unsafe	-0.307***	0.042***	0.060***	0.017***	-0.054***	-0.066***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day very unsafe	-0.443***	0.068***	0.086***	0.020***	-0.088***	-0.087***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Security/safety	Day fairly safe	-0.236***	0.053***	0.039***	-0.003***	-0.063***	-0.026***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Day neither safe	-0.445***	0.118***	0.058***	-0.020***	-0.118***	-0.038***
		(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
	Day bit unsafe	-0.723***	0.205***	0.078***	-0.042***	-0.186***	-0.0546***
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
	Day very unsafe	-1.326***	0.440***	0.028***	-0.117***	-0.286***	-0.065***
		(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. All models control for age, age-squared, race dummies, level of education, disability status, household income dummies & household size. Omitted category is 'Day very safe'.

A similar result is also uncovered for satisfaction with one's neighbourhood – relative to those who feel 'very safe' when walking in their neighbourhood, respondents who feel 'fairly safe' are more likely to report being 'very dissatisfied or dissatisfied' with their neighbourhood by 4-6%. Again, the probability of reporting low categories of satisfaction with own neighbourhood increases as perceptions of safety when walking during the day deteriorate. Relative to those who feel 'very safe', respondents who feel 'very unsafe' are more likely to report being 'very dissatisfied or dissatisfied' with their neighbourhood by 11-12%. Qualitatively, this result also generally applies to satisfaction with standard of living as well as satisfaction with safety/security provided by government. Interestingly, inferences drawn from the 2011 results are remarkably qualitatively similar to those uncovered in 2015. Thus, a general conclusion from both 2015 and 2011 results is that the more an individual feels unsafe when walking during the day in their neighbourhood the more likely they are to report low levels of satisfaction across all measures of subjective well-being.

Night safety

Table 5 presents estimates for the effects of night safety perceptions (i.e., respondent's safety feeling when walking in own neighbourhood at night) on subjective well-being. Similar to effects uncovered for day safety perceptions, we find a negative effect on subjective well-being and this is statistically significant at the 1% level. Relative to those who feel 'very safe' at night, the probability of being 'very dissatisfied' with life is 5% more for individuals who feel 'fairly safe' while the corresponding figure for those who feel 'very unsafe' is 8% in 2011.

Table 5: Effect of night safety perceptions on life satisfaction for 2011 & 2015

			Marginal effects				
Satisfaction with:		Coef	Very dissatisfied	dissatisfied	Neither	Satisfied	Very satisfied
Panel A: 2011							
Life as a whole	Night fairly safe	-0.321***	0.048***	0.057***	0.022***	-0.071***	-0.056***
		(0.051)	(0.009)	(0.009)	(0.003)	(0.013)	(0.008)
	Night neither safe	-0.370***	0.059***	0.065***	0.022***	-0.087***	-0.059***
		(0.059)	(0.012)	(0.010)	(0.002)	(0.016)	(0.008)
	Night bit unsafe	-0.366***	0.054***	0.064***	0.025***	-0.080***	-0.064***
		(0.050)	(0.008)	(0.009)	(0.003)	(0.012)	(0.008)
	Night very unsafe	-0.544***	0.078***	0.094***	0.038***	-0.114***	-0.097***
		(0.048)	(0.008)	(0.008)	(0.003)	(0.011)	(0.008)
Neighbourhood	Night fairly safe	-0.332***	0.043***	0.056***	0.026***	-0.076***	-0.049***
		(0.052)	(0.008)	(0.009)	(0.004)	(0.014)	(0.007)
	Night neither safe	-0.449***	0.065***	0.076***	0.031***	-0.113***	-0.060***
		(0.060)	(0.011)	(0.010)	(0.003)	(0.018)	(0.006)
	Night bit unsafe	-0.471***	0.062***	0.079***	0.036***	-0.109***	-0.069***
		(0.051)	(0.008)	(0.009)	(0.003)	(0.013)	(0.007)
	Night very unsafe	-0.594***	0.075***	0.098***	0.048***	-0.128***	-0.092***
		(0.043)	(0.007)	(0.008)	(0.004)	(0.012)	(0.007)
Standard of Living	Night fairly safe	-0.162***	0.023***	0.035***	0.007***	-0.044***	-0.021***
		(0.051)	(0.008)	(0.011)	(0.002)	(0.014)	(0.006)
	Night neither safe	-0.239***	0.037***	0.050***	0.008***	-0.066***	-0.029***
		(0.058)	(0.010)	(0.012)	(0.001)	(0.017)	(0.006)
	Night bit unsafe	-0.277***	0.041***	0.058***	0.011***	-0.075***	-0.035***
		(0.050)	(0.008)	(0.010)	(0.002)	(0.014)	(0.006)
	Night very unsafe	-0.566***	0.085***	0.117***	0.021***	-0.151***	-0.071***
		(0.048)	(0.008)	(0.010)	(0.002)	(0.013)	(0.006)
Security/safety	Night fairly safe	-0.630***	0.162***	0.083***	-0.002	-0.173***	-0.070***
		(0.052)	(0.016)	(0.005)	(0.002)	(0.015)	(0.005)
	Night neither safe	-0.874***	0.256***	0.082***	-0.021***	-0.241***	-0.076***
		(0.059)	(0.022)	(0.003)	(0.004)	(0.016)	(0.004)
	Night bit unsafe	-0.890***	0.233***	0.108***	-0.006**	-0.238***	-0.097***
		(0.051)	(0.016)	(0.005)	(0.002)	(0.014)	(0.005)
	Night very unsafe	-1.426***	0.359***	0.158***	-0.002	-0.341***	-0.175***
		(0.050)	(0.014)	(0.005)	(0.002)	(0.011)	(0.070)
Panel B: 2015							
Life as a whole	Night fairly safe	-0.248***	0.028***	0.042***	0.023***	-0.033***	-0.060***

		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Night neither safe	-0.379***	0.049***	0.065***	0.032***	-0.060***	-0.085***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Night bit unsafe	-0.296***	0.034***	0.050***	0.028***	-0.039***	-0.072***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Night very unsafe	-0.405***	0.044***	0.067***	0.039***	-0.048***	-0.102***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Neighbourhood	Night fairly safe	-0.345***	0.041***	0.055***	0.030***	-0.051***	-0.075***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Night neither safe	-0.467***	0.063***	0.076***	0.037***	-0.083***	-0.093***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
	Night bit unsafe	-0.466***	0.057***	0.074***	0.040***	-0.071***	-0.100***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Night very unsafe	-0.571***	0.064***	0.089***	0.051***	-0.073***	-0.130***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Standard of Living	Night fairly safe	-0.267***	0.035***	0.053***	0.016***	-0.045***	-0.059***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Night neither safe	-0.300***	0.042***	0.059***	0.017***	-0.054***	-0.063***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Night bit unsafe	-0.388***	0.052***	0.076***	0.022***	-0.067***	-0.084***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Night very unsafe	-0.512***	0.065***	0.100***	0.032***	-0.079***	-0.117***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Security/safety	Night fairly safe	-0.619***	0.158***	0.085***	-0.028***	-0.169***	-0.046***
		(0.002)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
	Night neither safe	-0.978***	0.291***	0.080***	-0.074***	-0.245***	-0.052***
		(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
	Night bit unsafe	-1.218***	0.339***	0.117***	-0.073***	-0.304***	-0.080***
		(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
	Night very unsafe	-1.602***	0.395***	0.180***	-0.050***	-0.379***	-0.146***
		(0.002)	(0.001)	(0.0002)	(0.000)	(0.000)	(0.000)

Notes: Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. All models control for age, age-squared, race dummies, level of education, disability status, household income dummies & household size. Omitted category is 'Night very safe'.

A consistent finding based on the marginal effects is that the probability of reporting low levels of satisfaction with life as a whole (i.e., very dissatisfied and dissatisfied) increases as individuals safety feelings decline. In addition, the probability of reporting high levels of satisfaction with life as a while (i.e., satisfied and very satisfied) decreases as an individual's feelings of safety at night decline. These findings extend to other measures of subjective well-being (i.e., satisfaction with neighbourhood, standard of living, safety/security patterns) and also apply to both 2011 and 2015 estimates. Notably, relative to other measures of well-being results suggest that safety feelings at night have the strongest impact on satisfaction with safety/security.

Home safety

Results on the effect of home safety perceptions (i.e., how safe one feels in own home) on subjective well-being are presented in Table 6. In 2011, all four subjective well-being measures (life, SOL, neighbourhood and safety/security satisfaction) have negative coefficients on the home safety dummy variables and these are statistically significant at the 1% level. These results indicate that if respondent feels anything other than 'very safe' in their home, they are less likely to be in higher categories of satisfaction across all measures of subjective well-being.

Table 6: Effect of home safety perceptions on life satisfaction for 2011 & 2015

			Marginal effects				
Panel A: 2011		Coef	Very dissatisfied	dissatisfied	Neither	Satisfied	Very satisfied
Life as a whole	Home fairly safe	-0.230***	0.030***	0.041***	0.019***	-0.047***	-0.042***
		(0.028)	(0.004)	(0.005)	(0.002)	(0.006)	(0.005)
	Home neither safe	-0.434***	0.069***	0.077***	0.025***	-0.105***	-0.067***
		(0.041)	(0.008)	(0.007)	(0.002)	(0.012)	(0.005)
	Home bit unsafe	-0.455***	0.074***	0.080***	0.025***	-0.111***	-0.069***
		(0.043)	(0.009)	(0.007)	(0.002)	(0.012)	(0.005)
	Home very unsafe	-0.834***	0.170***	0.132***	0.020***	-0.222***	-0.100***
		(0.050)	(0.015)	(0.007)	(0.003)	(0.015)	(0.004)
Neighbourhood	Home fairly safe	-0.258***	0.029***	0.043***	0.023***	-0.053***	-0.042***
		(0.029)	(0.004)	(0.005)	(0.003)	(0.006)	(0.005)
	Home neither safe	-0.564***	0.084***	0.096***	0.037***	-0.148***	-0.070***
		(0.042)	(0.009)	(0.007)	(0.002)	(0.013)	(0.004)
	Home bit unsafe	-0.555***	0.083***	0.094***	0.037***	-0.146***	-0.068***
		(0.044)	(0.009)	(0.007)	(0.002)	(0.014)	(0.004)
	Home very unsafe	-0.663***	0.109***	0.111***	0.038***	-0.183***	-0.075***
		(0.051)	(0.012)	(0.008)	(0.002)	(0.017)	(0.004)
Standard of living	Home fairly safe	-0.114***	0.015***	0.025***	0.006***	-0.030***	-0.015***
		(0.028)	(0.004)	(0.006)	(0.001)	(0.008)	(0.004)
	Home neither safe	-0.309***	0.048***	0.065***	0.009***	-0.087***	-0.035***
		(0.041)	(0.008)	(0.008)	(0.001)	(0.012)	(0.004)
	Home bit unsafe	-0.308***	0.048***	0.064***	0.009***	-0.087***	-0.035***
		(0.043)	(0.008)	(0.009)	(0.0008)	(0.013)	(0.004)
	Home very unsafe	-0.878***	0.190***	0.146***	-0.014***	-0.253***	-0.069***
		(0.051)	(0.016)	(0.006)	(0.004)	(0.014)	(0.003)
Security/safety	Home fairly safe	-0.371***	0.081***	0.059***	0.006***	-0.096***	-0.051***
		(0.028)	(0.007)	(0.005)	(0.001)	(0.008)	(0.004)
	Home neither safe	-0.709***	0.195***	0.081***	-0.012***	-0.197***	-0.068***
		(0.041)	(0.014)	(0.003)	(0.002)	(0.012)	(0.003)
	Home bit unsafe	-0.953***	0.282***	0.084***	-0.027***	-0.259***	-0.079***
		(0.043)	(0.016)	(0.004)	(0.003)	(0.011)	(0.003)
	Home very unsafe	-1.641***	0.547***	0.011	-0.084***	-0.382***	-0.092***
		(0.054)	(0.019)	(0.009)	(0.005)	(0.008)	(0.003)
Panel B: 2015							
	Home fairly safe	-0.246***	0.025***	0.041***	0.025***	-0.029***	-0.062***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Life as a whole	Home neither safe	-0.401***	0.051***	0.069***	0.034***	-0.066***	-0.088***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Home bit unsafe	-0.417***	0.053***	0.071***	0.035***	-0.068***	-0.092***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Home very unsafe	-0.528***	0.074***	0.090***	0.040***	-0.096***	-0.108***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Neighbourhood	Home fairly safe	-0.298***	0.031***	0.046***	0.028***	-0.036***	-0.069***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Home neither safe	-0.424***	0.055***	0.068***	0.035***	-0.074***	-0.084***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Home bit unsafe	-0.491***	0.066***	0.079***	0.039***	-0.088***	-0.096***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Home very unsafe	-0.508***	0.071***	0.082***	0.039***	-0.095***	-0.097***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Standard of living	Home fairly safe	-0.235***	0.028***	0.046***	0.016***	-0.035***	-0.055***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Home neither safe	-0.285***	0.039***	0.056***	0.016***	-0.051***	-0.060***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Home bit unsafe	-0.414***	0.060***	0.081***	0.021***	-0.079***	-0.083***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Home very unsafe	-0.466***	0.072***	0.090***	0.021***	-0.093***	-0.090***
		(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Security/safety	Home fairly safe	-0.295***	0.067***	0.048***	-0.005***	-0.079***	-0.031***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Home neither safe	-0.574***	0.157***	0.069***	-0.032***	-0.151***	-0.043***
		(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
	Home bit unsafe	-0.902***	0.268***	0.078***	-0.064***	-0.224***	-0.058***
		(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
	Home very unsafe	-1.317***	0.433***	0.034***	-0.117***	-0.286***	-0.064***
		(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. All models control for age, age-squared, race dummies, level of education, disability status, household income dummies & household size. Omitted category is 'Home very safe'.

For satisfaction with life as a whole, respondents who feel 'fairly safe' at home are 3% more likely report being 'very dissatisfied' while those who feel 'very unsafe' are 15% points more likely to report being very dissatisfied (relative to respondents who feel 'very safe'). If higher levels of life satisfaction are considered, relative to those who feel 'very safe' at home, individuals who feel 'fairly safe' ('very unsafe') are less likely to report being 'very satisfied' with life by 4% (10%). 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 declines (i.e., moves from feeling 'fairly safe' to 'very unsafe' relative to those who feel 'very safe'). This finding applies to all other subjective well-being measures (i.e., satisfaction with neighbourhood, standard of living and safety/security) and is consistent over-time.

Overall, marginal effects of being 'very dissatisfied or dissatisfied' when respondents feel 'very unsafe at home' are generally stronger in 2011 than 2015 across all measures of subjective well-being. To complement this result, individuals are less likely to report being 'satisfied' across all measures of well-being in 2011 relative to 2015. This result suggests a weakening effect which is very difficult to explain given the decline, albeit small, in feelings of safety at home in the two periods under consideration. Possibly explanations for this weakening effect are that respondents could have moved to neighbourhoods in which they feel safer in their homes over time, and or respondents have acquired a sense of desensitization. South African citizens who are often exposed to crime could become 'used' to crime and in this sense crime has a diminishing effect on their life satisfaction; despite whether or not they perceive the crime rate to have improved or worsened. It is also possible that measures of crime and crime victimization from the past year are not good longer-term measures of crime victimization.

5.4 Additional results – other covariates

All regression results presented in the preceding sections control for age, age-squared, race dummies, level of education, disability status, household income dummies 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, forty regressions are estimated (i.e., two years of data estimations on four subjective well-being outcome variables and five measures of crime). Due to space limitations full regression results (coefficients, marginal effects and corresponding standard errors of all other covariates) are not presented in the report. To make the report concise, Tables A.2 and A.3 in the Appendix present the signs of the coefficients from the ordered probit model for the additional covariates for 2011 and 2015 respectively. These tables also indicate whether the identified effects are statistically significant.

In 2011, statistically significant age effects tend to be U-shaped for satisfaction with life as a whole and the standard of living. Thus, as age increases satisfaction with life (and standard of living) tends to decrease until a certain age after which satisfaction with life (and standard of living) begins to increase with an increase in age. For satisfaction with neighbourhood and safety/security age effects are not robust. In 2015, statistically significant U-shaped age effects are uncovered for all subjective well-being variables. Regarding gender effects, in both 2011 and 2015, women are more

likely to be more satisfied with life as a whole and their standard of living relative to men and less likely to be satisfied with their safety/security, though results are not very stable across various measures of crime controlled for in the regressions.

Across all 2011 measures of subjective well-being, results show statistically significant racial effects; Africans, Coloureds and Indian/Asians have lower subjective well-being relative to whites. Results in 2015 agree with those in 2011, except in the case of Indian/Asians who have mixed results. Intuitively, these general racial effects are potentially reflective of the legacy of apartheid – a view consistent with Møller's (2001) finding. As expected, 2011 results show a positive relationship between education and all measures of subjective well-being (reference group being no schooling). The effects are mostly statistically significant for those with incomplete secondary, matric and tertiary education. Similar results are also observed in 2015 results. Unemployment and being disabled tends to significantly reduce satisfaction with life as a whole and the standard of living; however, these characteristics have statistically insignificant effects on satisfaction with the neighbourhood and safety/security in 2011. A more robust result is observed in 2015, where unemployment and being disabled tend to significantly reduce satisfaction across all measures of subjective well-being. Intuitively, there is a positive relationship between income and all measures of subjective well-being. Individuals living in households with higher levels of income (relative to those in households with a monthly income of R0-800) are likely to be more satisfied with their life as a whole, neighbourhood, standard of living and safety/security. Although with some variation in terms of significance, 2011 results generally indicate that individuals in larger household sizes tend to have lower levels of subjective well-being compared to those in smaller households. This result also applies to 2015 with the exception of satisfaction with life as a whole where the reverse applies.

6. Conclusion

Relatively few studies examine the link between crime and life satisfaction, especially in developing countries. Yet, understanding this relationship is fundamental for any assessment of social well-being given that exposure to crime has long lasting negative effects. The lack of studies in this area is possibly due to data constraints, particularly when it comes to crime data. The few studies that exist in South Africa on crime and subjective well-being 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. Given these limitations, there is room to add to the extant literature by examining a broad set of subjective

well-being measures and looking at other regions. To fill these gaps, this paper examines the extent to which crime determines the subjective well-being of Gauteng residents and how the relationship has evolved over time. To this end, the study estimates an ordered probit model utilizing (2011 and 2015) data from two sources, namely the Quality of Life Survey (QoL survey) conducted by the Gauteng City Region Observatory (GCRO) and the Institute of Security Studies (ISS) Crime Hub. The estimates are 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) which were regressed against five crime-related measures (i.e., crime rate, being a victim of crime, day, night and safety perceptions at home).

The key findings of this study are 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 crime rate in the neighbourhood of residence. The study also uncovers the importance of crime perceptions (i.e., perceived safety during the day, night and at home) in determining the well-being of Gauteng residents. As feelings of safety deteriorate (i.e., move from 'fairly safe' to 'very unsafe' relative to those who feel 'very safe') subjective well-being tends to diminish concomitantly. This result is generally consistent across all measures of well-being used for both 2011 and 2015. Møller's (2005) 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. These could include hotspot policing, increasing police presence in neighbourhoods and enforcing more stringent crime sentence.

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. Accordingly, the study fails to account for unobserved individual

characteristics which potentially determine subjective well-being. Further studies could benefit from sizeable and more comprehensive panel datasets.

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Appendix

Table A.1: 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 general 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:	
Female	Dummy=1 if respondent is female, =0 otherwise.
African	Dummy=1 if respondent is African, =0 otherwise.
Indian/Asian	Dummy=1 if respondent is Indian/Asian, =0 otherwise.
Coloured	Dummy=1 if respondent is Coloured, =0 otherwise.
White	Dummy=1 if respondent is White, =0 otherwise.
Age	Age of the respondent in years.
No Schooling	Dummy=1 if respondent has no schooling, =0 otherwise.
Primary education	Dummy=1 if respondent has a primary education, =0 otherwise.
Incomplete sec. educ.	Dummy=1 if respondent has an incomplete secondary education, =0 otherwise.
Matric	Dummy=1 if respondent has a matric, =0 otherwise.
Tertiary education	Dummy=1 if respondent has a tertiary education, =0 otherwise.
Employment status	Dummy =1 if respondent is unemployed and 'other' and 0 if employed.
Household income	Total monthly household income after deductions such as tax, medical aid and pension contributions. Categorical variable with 8 - categories. Dummies are created for each category.
Disability status	Dummy =1 if the respondent has a disability and =0 otherwise
Household size	Number of household members.

Table A.2: 2011 Results for additional covariates - ordered probit model coefficients

	Crime rate	Victim of crime	Night safety	Day safety	Home safety
Life as a whole					
Age	—	—	—	—	—
Age-squared	+	+	+	+	+
Female	+	+	+	+	+
African	—	—	—	—	—
Coloured	—	—	—	—	—
Indian/Asian	—	—	—	—	—
Primary education	+	+	+	+	+
Incomplete secondary	+	+	+	+	+
Matric	+	+	+	+	+
Tertiary education	+	+	+	+	+
Unemployment	—	—	—	—	—
Disabled	—	—	—	—	—
Income R800-1601	+	+	+	+	+
R1601-3200	+	+	+	+	+
R3201-6400	+	+	+	+	+
R6401-25600	+	+	+	+	+
R25601-51200	+	+	+	+	+
R51201+	+	+	+	+	+
Household size	—	—	—	—	—
Satisfaction with neighborhood					
Age	+	—	—	—	—
Age-squared	—	—	—	—	—
Female	+	—	—	—	—
African	—	—	—	—	—
Coloured	—	—	—	—	—
Indian/Asian	—	—	—	—	—
Primary education	+	+	+	+	+
Incomplete secondary	+	+	+	+	+
Matric	+	+	+	+	+
Tertiary education	+	+	+	+	+
Unemployment	—	—	—	—	—
Disabled	+	+	+	+	+
Income R800-1601	+	+	+	+	+
R1601-3200	+	+	+	+	+
R3201-6400	+	+	+	+	+
R6401-25600	+	+	+	+	+
R25601-51200	+	+	+	+	+
R51201+	+	+	+	+	+
Household size	—	—	—	—	—
Satisfaction with standard of living					
Age	—	—	—	—	—
Age-squared	+	+	+	+	+
Female	+	+	+	+	+
African	—	—	—	—	—
Coloured	—	—	—	—	—
Indian/Asian	—	—	—	—	—

Primary education	+	+	+	+	+
Incomplete secondary	+	+	+	+	+
Matric	+	+	+	+	+
Tertiary education	+	+	+	+	+
Unemployment	—	—	—	—	—
Disabled	—	—	—	—	—
Income R800-1601	+	+	+	+	+
R1601-3200	+	+	+	+	+
R3201-6400	+	+	+	+	+
R6401-25600	+	+	+	+	+
R25601-51200	+	+	+	+	+
R51201+	+	+	+	+	+
Household size	—	—	—	—	—
Satisfaction with safety/security					
Age	—	+	+	+	+
Age-squared	+	+	+	+	+
Female	—	—	—	—	—
African	—	—	—	—	—
Coloured	—	—	—	—	—
Indian/Asian	—	—	—	—	—
Primary education	+	+	+	+	+
Incomplete secondary	+	+	+	+	+
Matric	+	+	+	+	+
Tertiary education	+	+	+	+	+
Unemployment	—	—	—	—	—
Disabled	+	+	+	+	+
Income R800-1601	+	+	+	+	+
R1601-3200	+	+	+	+	+
R3201-6400	+	+	+	+	+
R6401-25600	+	+	+	+	+
R25601-51200	+	+	+	+	+
R51201+	+	+	+	+	+
Household size	—	—	—	—	—

Notes: Blue signs indicate that coefficient is statistically significant at either 1%, 5% & 10% levels while red signs indicate that coefficients are not at the usual 1%, 5% & 10% levels.

Table A.3: 2015 Results for additional covariates - ordered probit model coefficients

	Crime rate	Victim of crime	Night safety	Day safety	Home safety
Life as a whole					
Age	—	—	—	—	—
Age-squared	+	+	+	+	+
Female	+	+	+	+	+
African	—	—	—	—	—
Coloured	—	—	—	—	—
Indian/Asian	+	+	+	+	+
Primary education	+	+	+	+	+
Incomplete secondary	+	+	+	+	+
Matric	+	+	+	+	+
Tertiary education	+	+	+	+	+
Unemployment	—	—	—	—	—
Disabled	—	—	—	—	—
Income R800-1601	+	+	+	+	+
R1601-3200	+	+	+	+	+
R3201-6400	+	+	+	+	+
R6401-25600	+	+	+	+	+
R25601-51200	+	+	+	+	+
R51201+	+	+	+	+	+
Household size	—	+	+	+	+
Satisfaction with neighborhood					
Age	—	—	—	—	—
Age-squared	+	+	+	+	—
Female	—	—	+	+	+
African	—	—	—	—	—
Coloured	—	—	—	—	—
Indian/Asian	—	—	—	—	—
Primary education	+	+	+	+	+
Incomplete secondary	+	+	+	+	+
Matric	+	+	+	+	+
Tertiary education	+	+	+	+	+
Unemployment	—	—	—	—	—
Disabled	—	—	—	—	—
Income R800-1601	+	+	+	+	+
R1601-3200	+	+	+	+	+
R3201-6400	+	+	+	+	+
R6401-25600	+	+	+	+	+
R25601-51200	+	+	+	+	+
R51201+	+	+	+	+	+
Household size	—	—	—	—	—
Satisfaction with standard of living					
Age	—	—	—	—	—
Age-squared	+	+	+	+	+
Female	+	+	+	+	+

African	−	−	−	−	−
Coloured	−	−	−	−	−
Indian/Asian	−	−	+	+	−
Primary education	+	+	+	+	+
Incomplete secondary	+	+	+	+	+
Matric	+	+	+	+	+
Tertiary education	+	+	+	+	+
Unemployment	−	−	−	−	−
Disabled	−	−	−	−	−
Income R800-1601	+	+	+	+	+
R1601-3200	+	+	+	+	+
R3201-6400	+	+	+	+	+
R6401-25600	+	+	+	+	+
R25601-51200	+	+	+	+	+
R51201+	+	+	+	+	+
Household size	−	−	−	−	−
Satisfaction with safety/security					
Age	−	−	−	−	−
Age-squared	+	+	+	+	+
Female	−	−	+	−	−
African	−	−	−	−	−
Coloured	−	−	−	−	−
Indian/Asian	−	−	+	−	−
Primary education	+	+	+	+	+
Incomplete secondary	+	+	+	+	+
Matric	+	+	+	+	+
Tertiary education	+	+	+	+	+
Unemployment	−	−	−	−	−
Disabled	−	−	−	−	−
Income R800-1601	+	+	+	+	+
R1601-3200	+	+	+	+	+
R3201-6400	+	+	+	+	+
R6401-25600	+	+	+	+	+
R25601-51200	+	+	+	+	+
R51201+	+	+	+	+	+
Household size	−	−	−	−	−

Notes: Blue signs indicate that coefficient is statistically significant at either 1%, 5% & 10% levels while red signs indicate that coefficients are not at the usual 1%, 5% & 10% levels.