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A discrete spatial choice model of burglary target selection at the house-level

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ABSTRACT

This article studies how burglars select a house to burglarize. We draw on the rational choice perspective to investigate how burglars select a target by relying on house-related attributes to optimize a combination of perceived rewards, efforts and risk. It extends current applications of the discrete spatial choice framework to burglary target selection by adopting the house as the spatial unit of analysis and studies burglars' target selection process in a larger and more diverse study area than that of earlier studies. Using data on 650 residential burglaries and on approximately 500,000 residential properties in the Belgian province East Flanders, we consider a discrete spatial choice model of burglary target selection to establish which house-related attributes influence burglars' target selection process. Our findings demonstrate that terraced houses, houses without a garage, houses that have not been outfitted with a central heating and/or air-conditioning system and houses nearby burglars' residences are more likely to be selected. Overall, our analysis suggests that burglars rely on effort-related attributes to distinguish between targets while higher perceived rewards actually decrease the odds of a house being burglarized. Risk-related attributes are unimportant for burglars' target choice.

1. Introduction

Recent years have seen an increase of geospatial research into crime in general and burglary in particular. Numerous studies are interested in exploring spatiotemporal variations in burglary (Andresen & Malleson, 2013; de Melo, Matias, & Andresen, 2015; D. Johnson, 2013; Ye, Xu, Lee, Zhu, & Wu, 2015) and examining how features of the physical environment affect the spatial patterning of burglary (Breetzke, 2012; Wu et al., 2015). One distinct strand of geographical criminological research that has recently gained traction applies the discrete spatial choice framework to study where burglars offend and what makes them prefer one target over another (Bernasco, 2006, 2010b; Bernasco, Johnson, & Ruiter, 2015; Bernasco & Nieuwbeerta, 2003, 2005; Clare, Fernandez, & Morgan, 2009; Townsley et al., 2014; Townsley, Birks, Ruiter, Bernasco, & White, 2015). While these studies have advanced the understanding of offenders' spatial decision-making processes, thus far they have not touched upon the core of burglary target selection: how do offenders pick a particular house to burglarize. The spatial resolution of existing applications of the discrete spatial choice approach to crime target selection does not yet fully align with the theoretical and empirical understanding of burglars' target selection process. Prior work has exclusively focused on intermediary outcomes and used larger spatial units of analysis such as neighborhoods or postal code areas to model burglars' target selection process, even though burglars ultimately select a house to burglarize.

This paper addresses this shortcoming and seeks to establish which attributes at the house-level influence offenders' decision when selecting a residential property as a burglary target. In answering this question, the present study introduces several advancements over prior work into burglars' spatial decision-making processes. First, this is the first discrete spatial choice study that models the target selection process of burglars using the house as

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the spatial unit of analysis. Previous studies modeled this process as a choice between larger spatial units such as residential neighborhoods (Bernasco, 2006, 2010b; Bernasco & Nieuwbeerta, 2005; Clare et al., 2009; Townsley et al., 2014). These applications are not erroneous as such, since offenders are assumed to rely on a spatially structured hierarchical target selection process in which they initially select a larger area such as a neighborhood before gradually narrowing down their choice (Bernasco, 2010a, p. 117), but they fail to appreciate that burglars ultimately burglarize a house. In other words, the spatial resolution of existing applications of the approach is not aligned with the outcome of offenders' spatial choice behavior and the decisions they are expected to make when looking for a particular burglary target. In addition, the use of fine-grained spatial units of analysis such as the house that is burglarized has the advantage that it addresses the modifiable areal unit problem and reduces the risk of aggregation bias (Bernasco, Block, & Ruiter, 2012; Oberwittler & Wikström, 2009). Aggregation bias and spatial heterogeneity may impact the outcome of geospatial criminological research. Whenever possible, smaller spatial units of analysis are to be preferred over larger spatial units of analysis (Andresen & Malleson, 2011; Oberwittler & Wikström, 2009). Since micro-places more accurately measure the environment in which the offender acts, it is preferable to conduct geospatial criminological research at the most fine-grained spatial resolution available. With respect to burglary, there is little debate that the house is naturally the smallest spatial unit of analysis available (Bernasco, 2010a). Essentially, burglary is about an offender finding a suitable house to burglarize and committing his offence within a clearly confined space. In this study, we consider a discrete spatial choice model of burglary target selection in which every burglar can choose among 503,589 residential properties in a Belgian province to pick a burglary target.

Furthermore, the current application of the discrete spatial choice approach focuses on the importance of house attributes for offenders' choice of crime site. Previous crime location choice studies focused on environmental attributes at higher levels of spatial aggregations such as neighborhood affluence or area accessibility. This has resulted in numerous studies convincingly establishing the role and importance of area characteristics in offenders' target selection process, including a recent effort to systematically replicate the effects of environmental attributes on burglary crime location choice in three cross-national study regions (e.g., Townsley, et al., 2014). Due to the lack of widely available small-scaled spatial data, no discrete spatial choice studies have been able to focus on the role of house-level characteristics in burglars' target selection process. Instead of replicating the results of previous crime location choice studies, this study models offenders' target choices as a combination of house-related attributes and in doing so combines the analytical framework of discrete spatial choice with earlier insights from a well-established research tradition that applies offender interviews, ethnography and experiments to understand burglary target selection (e.g., Nee & Taylor, 2000).

Finally, the proposed discrete spatial choice model is operationalized in a study area that is larger and more diverse than that of earlier implementations. The study area comprises the entire province of East Flanders (Belgium), a densely urbanized polycentric study area with a population of approximately 1.5 million inhabitants distributed across 12 cities and 53 towns. This study area is much larger in terms of population size, surface area and available alternatives than that of cognate burglary studies, including Bernasco and Nieuwbeerta (2005), Bernasco (2006, 2010b), and Clare et al. (2009) that have primarily relied on crime data from a single city or metropolitan area. With the exception of Bernasco et al. (2015), no discrete choice studies of crime target selection have yet looked at a single study area that contains multiple cities and towns.

This article is structured as follows. The next section starts with a brief discussion of the rational choice perspective and burglary target selection. The methodology section discusses the discrete spatial choice framework as our preferred method of analysis. In the subsequent section, we present the study area and the data. This is followed by a section that addresses our research hypotheses. The main findings are presented in the results section. We conclude with a discussion of the results in light of the current knowledge base regarding burglars' target selection process and outline avenues for future work.

2. Burglars' target selection process: balancing reward, effort and risk

The rational choice perspective (Cornish & Clarke, 1986b) is one of the dominant frameworks for understanding offenders' behavior, including offender spatial decision-making and their target selection process (Bernasco et al., 2015). It is a heuristic tool for looking at offending behavior and the decisions that underlie and shape this behavior. The perspective is rooted in microeconomics and offers a lens for understanding how and where individual offenders decide to exploit perceived criminal opportunities and commit their offences. From within the rational choice perspective, it is argued that offenders are rational insofar that their behavior is purposive and expresses their intention to benefit themselves (Cornish & Clarke, 1986a, 2006). The perspective proposes that offenders balance the costs and benefits of their decisions and that when they are confronted with a choice, they will select that particular alternative from a larger set of alternatives that appears to be the best outcome of that balancing act of costs and benefits (Bottoms, 2007, p. 541; Elffers, 2004, p. 184). Offenders aim to maximize their benefits while keeping the anticipated costs to a minimum (Pettiway, 1982; Van Koppen & Jansen, 1998). To do so, they rely on environmental and situational cues related to rewards, efforts and risks (Cornish & Clarke, 2006).

Consistent with the arguments contained within this framework, previous research highlights that a range of target-specific, environmental attributes related to rewards, efforts and risks affect burglars' target choices. Ethnographic research and offender interviews suggest that burglars are driven by monetary gain and favor apparently wealthier targets over poorer ones since these offer better chances of making a greater financial profit (Bennett & Wright, 1984; Maguire & Bennett, 1982; Rengert & Wasilchick, 1985). Furthermore, burglars have indicated that they select dwellings based on certain visible cues that signal target profitability such as the size of the house and its general upkeep (Nee & Taylor, 2000; Wright & Decker, 1994). This allows us to articulate our first hypothesis that higher perceived rewards increase the likelihood that a house is burglarized.

Given the circumstances, offenders exert as little effort as possible to achieve their goal and in doing so are very similar to other individuals in their daily activities (Zipf, 1949). One important strategy to minimize effort is to select nearby targets instead of remote ones. This is known as the distance-decay effect and is widely reported in journey-to-crime research (Bernasco, 2006; Pyle, Hanten, Williams, Pearson, & Doyle, 1974; Turner, 1969; Wiles & Costello, 2000). Another strategy reported in research is to select targets that can easily be broken into because they have multiple points of entry, preferably on the side or back of the