



Weapons and violence: A review of theory and research

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ABSTRACT

Weapons are used in approximately one quarter of all violent incidents and the majority of homicides in the US, and the UK. Despite their overwhelming contribution to violent harm, theories of weapon related behaviors are scarce, and little is known of their correlates. This paper reviews available theories of weapon related behavior and identifies a number of motivations for weapon carrying, such as self defense, victim coercion, causing harm and self presentation. Correlates of weapon carrying and weapon use such as age, gender, socioeconomic status, exposure to weapons and history of aggression are explored and a number of limitations to current research approaches are identified. The review concludes with a discussion of future directions for research.

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1. Introduction

Weapons are used in a quarter of violent incidents in the US, and the UK (Rand & Catalano, 2007; Kershaw, Nicholas, & Walker, 2008), and the majority of violent deaths in these countries involve some kind of weapon (US Department of Justice/Federal Bureau of Investigation, 2007; Povey, Coleman, Kaiza, & Roe, 2009). Despite considerable contribution of weapons to violent harm, weapon related behaviors have rarely received direct research attention, perhaps being regarded as a consequence and a facilitator of aggression, and a prelude to violence rather than as a distinct behavior.

Most likely in reaction to recent school based homicides in the US, the issue of weapon carrying among adolescents has emerged as an important topic of research in recent years (Lane, Cunningham, & Ellen, 2004; McGee, Carter, Williams, & Taylor, 2005). The consistently high rate of firearm related homicide in the US, compared to other developed countries (Fingerhut, Cox, & Warner, 1998) has also been of interest to criminologists, public health practitioners, and policy makers (Cook & Ludwig, 2002; Kellermann et al., 1996; Kleck & Gertz, 1995). In much the same way that gun carrying in schools emerged as an important and politically salient topic in the US, a series of knife related homicides in the UK has led the political, media and academic establishments to take notice of this issue. In a report on knife related crime in England and Wales, Eades (2006) noted that “relatively little detailed information exists on ‘knife crime’ and knife carrying, who is committing it, who is suffering it, the reasons for it and what might be the best ways of reducing it.” He further notes in his conclusion, “...the lack of research and coordinated, evidence based policies to deal with the problem is hard to justify – particularly to the victims of [knife related homicide] offenses” (p.33).

This review aims to describe existing theories of weapon carrying and weapon use, while suggesting new directions for theoretical explanations of these behaviors. In addition, research identifying correlates of weapon carrying and weapon use at intergroup and interpersonal levels are presented. Finally, efforts to reduce weapon related violence are examined and directions for further research are described.

The definition of a weapon varies across legal systems, but an adequate description would be a tool that is designed or adapted to cause physical harm. The available literature on weapon use frequently fails to distinguish between carrying of weapons and using weapons in violence. It is possible that these behaviors have very different motivations and outcomes. In this review, we suggest that use and carrying should be regarded as distinct and are influenced by different factors. Within this article, weapon carrying refers to the possession of a weapon on the person. Weapon use refers to the use of a weapon to threaten or harm. Occasionally, the term *weapon related behavior* will be used when the distinction between the terms is less important.

2. Theoretical explanations of weapon related behavior

There are at least two theoretical approaches to weapon use. First, weapon use can be thought of as subsumed within the violent act, implying that theories of aggression and violence will therefore explain weapon use and so negating the requirement of discrete weapon theories. Alternatively, weapon use may be more complex, the etiology of which involves the presence of at least two potentially unrelated factors: the decision to carry or possess a weapon and aggression. The former perspective suggests that weapon use can be

addressed through tackling factors that promote aggression and violence whereas the second perspective suggests weapon use can be addressed through two routes, by addressing factors that promote violence and through addressing factors that promote the decision to carry or possess a weapon. We argue in this paper (see below) that the former perspective can be rejected as factors that promote weapon use are not necessarily specific to the weapon user's proclivity for violence and aggression. In this paper we therefore develop a theoretical perspective that is adequate to explain weapon use and one that suggests preventative measures for weapon related violence. This section details available theories of weapon related behavior.

The view that weapons are simply an instrument for harm within a violent act is undermined by evidence indicating weapon carrying can be regarded as instrumental, the weapon as a tool to attain nonviolent goals, and evidence suggesting weapons are carried for defensive reasons under the risk of violent victimization rather than as an expression of the weapon carrier's aggression.

The instrumental use of tools for offensive and defensive purposes is evident across both human and nonhuman primates. Goodall (1986) provides accounts of chimpanzees using sticks and stones as weapons against other chimpanzees, baboons, and humans. Moreover, Calvin (1982) suggests that using weapons played a critical role in the evolution of eye-hand coordination, language development, and gave our human ancestors an important competitive advantage by allowing hunters to keep their distance from dangerous prey and enabling the capture of new prey which was previously too fast to catch. Many current theories of weapon related behavior, specific to humans, rely on similar explanations (i.e., that weapons are carried and used because they facilitate goal attainment). Below, we discuss a model put forward by Harding (1993) in which he merges the *rational human* type argument with social learning theory in his explanation of weapon use. This is followed by Sheley and Wright's (1993) juxtaposition of instrumental and expressive motivations for weapon use. Wilkinson and Fagan's (2001) integrated situational theory of violent events is then described. Finally, we describe potential insights into interpersonal weapon related behavior from the political science literature on weapons proliferation.

Harding (1993) suggests that the context in which weapons are observed greatly influences future weapon related behavior. He found that, among a sample of Australian violent offenders ($n=88$), gun users were more likely to have gained their introductions and their first practical experiences with guns from peer group members including siblings, friends, and gun using criminals, compared to those who were introduced to guns by authority figures such as older relatives. Similarly, Wright and Rossi's (1986) study of armed criminals found that fathers of offenders were irrevocably linked to the *'legitimate'* aspects of gun use, while peer influences overtake those of authority figures when the *'illegitimate'* aspects of gun use are considered. Furthering his point at an epidemiological level, Harding (1993) notes that, despite very high rates of firearm ownership, incidence of violent crime in Switzerland was 86 per 100,000 population in 1994, compared with 504 per 100,000 in the UK and 713 per 100,000 in the US (World Health Organization, 2002). More specifically, Harding (1990) notes that, while prevalence of gun ownership is two thirds that of the US, its homicide rate is one tenth of that in the US. In explaining this phenomenon, Harding (ibid.) argues that, whereas in the US firearms are mostly owned for “personal gratification” (Harding, 1993, p.95), Swiss citizens largely own firearms as an obligation to the state. In the US, ownership of firearms

is a *right* embedded within the Constitution as opposed to an *obligation* in the Swiss Constitution. As Harding (ibid.) puts it: “The [Swiss] social meaning of gun ownership is anchored in civic responsibility” (p.95). The suggestion here is that attitudes towards weapon use are informed by relevant peer and familial influences through a process of social learning.

In an effort to add a rational choice paradigm to his theory of weapon use, Harding (1993) notes that offenders make decisions regarding their choice of weapons based on the expected requirements of commissioning an offence, such as ‘victim management’ in armed robbery. Harding also maintains that weapon types hold different values for individuals. For example, the gun may be regarded as a ‘defensive’ weapon, while the knife is seen as an ‘offensive’ weapon. In an earlier paper, Harding (1990) employed this rational choice argument to suggest that mandatory minimum sentencing for use of a firearm in commissioning an offence may reduce incidence of firearm use among offenders. Limited evidence exists to support this assertion (McDowall, Loftin, & Wiersma, 1992). Harding’s (1993) overarching proposition is that an offender’s weapon choice is influenced by the context in which they were introduced to weapons, the anticipated particulars of the offense and, perhaps to a lesser extent, the punitive consequences of using such a weapon.

In sum, evidence suggests that the decision to carry a weapon and the use of a weapon cannot be reduced to the motivations associated with aggression. The following section more formally examines the factors associated with weapon carrying and use, within a decision making context, and further involves situational factors. We then provide a more formal theoretical framework that highlights similarities across individual and nation state decisions to use weapons, the value of the latter is that this area has received considerable attention, and therefore allows opportunities to develop the understanding of individual weapon use through reference to a more rich literature on nation state weapon use. In so doing, we develop the subjective importance of the “perceived adversary.”

2.1. Decision making and situational weapon use

Wilkinson and Fagan (2001) shift the focus from individual motivations for weapon related behaviors to a more interactionist approach to violence. Their theory combines motivations for arriving in a given situation with factors that influence how the situation develops, such as the effects of social influences and evaluations of risk. The authors first describe the need for understanding pathways that lead from arousal to aggression, then note a series of decisions that lead to a violent altercation involving a *gun*: “decisions to carry guns, to bring oneself to a setting where guns are likely to be present, to pursue a dispute that may turn deadly, to show a gun or make a threat with it, and ultimately to use the gun or to avoid its use” (pp.181–182). Each of these decisions is preceded by a four stage rational analysis incorporating “the value of the outcome, expectations of success, the value of the costs and expectations of the costs.” The authors emphasize young people’s myopia in respect of the perceived outcomes that influence their decisions (e.g., Dodge & Newman, 1981). Third, the social aspects of violent events are considered, with an emphasis on impression management, ‘disputatiousness’ and ‘aggressiveness.’ Luckenbill and Doyle (1989) define disputatiousness as the propensity to escalate an interaction towards a conflict, while aggressiveness is the propensity to further escalate the conflict into violence. In terms of impression management, the value of weapon carrying and weapon use in a violent subculture is clear. Developing a reputation for ‘irrational’ behavior may make a criminal lifestyle somewhat easier (Levi & Maguire, 2002) – at least in the short term. Penultimately, the authors describe the role of ‘scripting’ in violent outcomes, similar to Harding’s (1993) assertions about the role of socialization, these ‘scripts’ represent a series of learned actions that are accessed during violent situations

and influence individual behavior. Largely informed by social learning perspectives on violence (e.g., Dodge, Bates, & Pettit, 1990), this feature of weapon use represents a key target for behavior change among weapon users. Finally, Wilkinson and Fagan (2001) emphasize the importance of studying how the wider interindividual contexts of weapon use, such as street codes, influence an individual’s decision making during potentially violent altercations. In addition, they note that many “street oriented” youths have limited available methods, or scripts, for resolving disputes. Again, identifying and addressing these limitations in youths’ scripts present opportunities to influence weapon related behavior change.

Wilkinson and Fagan (2001) integrate proximal and distal influences on the decision to use a weapon in an altercation. However, they do not offer an explanation of the individual’s decision to *carry* a weapon. Research on this decision has thus far oversimplified a complex process. Investigators have sought to explain the behavior through unidimensional motivations such as fear of victimization (Khoury-Kassabri, Astor, & Benbenishty, 2007), lack of trust (Hemenway, Kennedy, Kawachi, & Putnam, 2001), feelings of power (Stretesky, Pogrebin, Unnithan, & Venor (2007), impression management/violent identity (Stretesky & Pogrebin, 2007), and mating effort (Barlas & Egan, 2006). Focusing on single themes does not account for the existing social cognition literature that could assist in explaining this complex behavior (e.g., Nabi, 2002; Guerra, Huesmann, & Spindler, 2003). We suggest that a useful position from which to continue investigations of weapon carrying is through adopting the framework extant in the literature on arms acquisitions by nations. This established area of work may offer insights into the processes that precede and reinforce an individual’s weapon carrying behavior; in particular the consequences of weapon related decisions – serious harm to the individual, serious harm to an adversary or deterrence thereof – are consistent across both areas. In addition, as with much of the literature on individual decision making, the weapons acquisition literature is based on the idea of rational decisions made in response to or preempting the actions of an identified adversary. Gleditsch (1990) summarizes the decision to acquire arms on four levels – Internal (subunits of the actor), Actor (the actor itself), Relational (relations between two or more actors) and System (the social system or the physical context). While internal subunits, such as bureaucratic, economic, or military interest groups are not directly applicable to the individual, they do allude to individual ‘motivations’ to carry weapons, while Actor, Relational, and Systemic factors such as pride, preemptive deterrence and turning points in power distributions, respectively, can all be directly applied to the decisions of an individual.

The factors that drive national decisions to acquire or not acquire arms can be applied to much smaller groups. For example, conflict resolution studies indicate that intragroup conflict can be alleviated by creating external conflict. This social cohesion can be created by the acquisition of weapons or use of violence against another group. This concept can be readily applied to violent gangs and suggests that targeting individual violence and weapon related behaviors will be more successful than targeting the behaviors of a loosely related group of individuals. At the intergroup level, motivations for weapon carrying can be modeled upon ‘action-reaction’ frameworks of international arms races, allowing interventions to be informed and tested based on historical altercations. Similarly, terms such as ‘burden sharing’ provide previously unexamined insights into intergroup motivations for weapon carrying. At this stage, the success of such a translation of constructs is hypothetical. However, with development, it may provide a convenient theoretical framework for novel interventions against weapon violence.

2.2. Weapon choice

As Kleck and McElrath (1991) note, “only a fool attacks a man with a gun” (p.670). Ambivalence in this phrase epitomizes the varied role

of the weapon in violent situations. In understanding weapon use, the researcher must look at the utility and rationality attached to the choice of weapon by an individual.

The utility of a weapon to inflict harm and force compliance is clear. If availability was not a constraining factor, would offenders choose to use anything other than a gun? [Harding \(1993\)](#) suggests that the issue of socialization may explain why weapon choice is more variable. [Cao, Zhang, and He \(2008\)](#) argue that the psychosocial and historical correlates of gun carrying vary from those of carrying other weapons for protection. This suggests that weapon of choice decisions, assuming equal accessibility, are influenced by a range of social and contextual factors. As noted, [Harding \(1993\)](#) refers to weapon use as a rational method of 'victim management' in armed robberies, with weapon choice determined by the weapon's 'operational value' (p.91) in the commission of the crime.

Weapons can be used both to cause and to deter harm and offenders' intentions are often reflected in their weapon of choice. It is likely that carrying weapons under certain circumstances may be solely motivated by the need for self defense ([Smith & Uchida, 1988](#)). Survey analysis indicates that this is the case. [Bailey, Flewelling, and Rosenbaum \(1997\)](#) suggest that adults tend to purchase weapons for their own safety while adolescents do not. A study of adolescent fighting and weapon carrying by [Pickett et al. \(2005\)](#) found that males more often carried weapons associated with "proactive aggression (e.g. guns, sticks or clubs, brass knuckles)" whereas, girls carried weapons for "defensive purposes (e.g. mace, pepper spray, tear gas)" (p.860). However, the authors note that intention cannot be inferred based on a simple survey report, and this finding may simply reflect the availability of weapon types to different genders, rather than some rational decision based on perceived vulnerability or offending intentions.

3. Implicit and explicit powers of the weapon

This section explores a number of motivations for carrying and using weapons. By gaining an understanding of these motivations, more definitive theories of weapon related behaviors can be constructed. Modeling weapon carrying and use through the eyes of a weapon carrier provides an insight into how successful interventions against weapon violence can be developed.

3.1. Weapons and harm – an inspection of costs and benefits

[Wells and Horney \(2002\)](#) discussed the roles of weapons and the intentions of offenders in 2,085 violent and potentially violent incidents ($n = 704$). They found that, relative to attacks that did not feature a weapon, the risk of injury decreased by 58% when an assailant attacked with a gun. However, [Kleck and McElrath \(1991\)](#) report that, while a weapon can act as a defense against crime, once an injury is actually incurred with a weapon, probability of death increases, compared to injury without a weapon. Both [Felson and Messner \(1996\)](#) and [Brennan, Moore, and Shepherd \(2006\)](#) have found that use of any weapon in violence is associated with increased severity of injury. Particular types of weapon are more likely to lead to serious harm than others. Firearms increase the likelihood of death by 40 times, while use of a knife increases likelihood of death by a factor of four compared to similar assaults without weapons ([Felson & Messner, 1996](#)) with the likelihood of death further positively related to bullet caliber ([Zimring, 1972](#)).

In light of evidence for the harm potential of weapons, one might ask why weapons are not used in every altercation. Possession or presentation of a weapon gives an individual a distinct advantage over his/her opponent. In an altercation, it can act as an expedient supplement to existing physical and cognitive attributes. [Wells and Horney \(2002\)](#) further suggest that gun use reduces the psychological effort requirements of violent crime, while [Kleck \(1997\)](#) describes

shooting as an "impersonal, emotionally remote and even antiseptic way of attacking others" (p.221). Such reduced psychological requirement results in violent attacks that may not have taken place in the absence of firearms.

The harm potential associated with weapon use in violence increases both the costs and benefits of violence. As noted above, the physical effort of the violent act is reduced. Subsequently, the chances of immediate retaliation and subsequent physical harm are also reduced. In the long term, the individual's reputation as a dangerous person is reinforced. In addition, the harm potential of the weapon may be seen as resulting in greater likelihood that they will not be victimized. Converse to these benefits of weapon use, the potential costs of weapon use include increased legal sanctions; increased potential for delayed physical retaliation; increased likelihood of causing physical harm and the associated psychological reactions; and the increased likelihood of loss of social support. Weapon use represents a steepening of gradients in the cost-benefit dynamic of violence.

3.2. The weapon effect

The mere presence of a weapon can elicit an increase in aggressive behavior in individuals ([Berkowitz & LePage, 1967](#)). Recent research indicates that weapon associated words increase the likelihood of aggression related responses in experimental tasks ([Anderson, Benjamin, & Bartholomew, 1998](#)). This 'priming' effect of weapons is believed, at least with firearms, to be affected by both weapon context (e.g., hunting vs. assault weapons) and individual familiarity with weapons ([Bartholow, Anderson, Carnagey, & Benjamin, 2005](#)), suggesting a potential degradative effect of this phenomenon among frequent weapon users and a heightened potential for weapon effects among societies with lower levels of weapon availability. While the experimental evidence for a 'weapons effect' is robust, the phenomenon has yet to be generalized to real world scenarios. In contrast to the offensive effect of a weapon, [Kleck and McElrath \(1991\)](#) suggest that during altercations where there is a potential for violence, the presence of a knife or a gun may reduce the likelihood of actual violence as it plays a coercive role, allowing the weapon carrier to exert control over another with an increased threat of violence.

The following sections will examine the motivations behind weapon carrying and weapon use. For conceptual clarity, we will discuss weapon use within the two major themes of interpersonal violence ([Megargee, 1982](#)): *instrumental* and *expressive*.

3.3. Instrumental weapon use

This section focuses on three instrumental motivations for weapon carrying and weapon use – protection, coercion and harm.

The fear of physical victimization may motivate a need for additional protection in those who do not have the confidence, or psychological strength, to protect themselves and such people may resort to carrying or using weapons ([Felson, 1996](#)). The deterrent effect of weapon carrying on likelihood of victimization is central to firearm advocacy in the US and is central to the logic of weapon carrying among adolescents in the UK ([Lemos, 2004](#)). A social deterministic argument against use of weapons as deterrents against victimization is that, hypothetically, universal weapon carrying would promote the development of more sophisticated and possibly more destructive weapons. Furthermore, while responding to aggression with aggression is understandable, human responses to fear are more complex. [Arria, Borges, and Anthony \(1997\)](#) suggest: "First, fear could actually signal reduced risk of injury due to violence (e.g., by virtue of constraining otherwise greater exposure to threats in interpersonal violence). Alternatively, in an environment perceived as threatening, fear could prompt exaggerated and potentially maladaptive expressions of self protection, perhaps in the form of carrying a weapon"

(pp.556–557). Further, below we discuss the effects of victimization and fear of victimization on the likelihood of carrying a weapon across a variety of groups.

3.4. Coercion, crime and weapons

Tedeschi and Felson (1994) define coercive power as the ability to influence another person's behavior using threats of harm or actual harm. The display of a weapon during an altercation creates a definite power shift towards the carrier. The threat of violence with a weapon is seen as a method of coercion that will facilitate compliance and Kleck and McElrath (1991) suggest that presence of a weapon in an altercation makes a physical attack less likely. In support, Cook (1986) has found from US National Crime Survey (NCS) data from the period 1973–79, that the probability of not being attacked by a threatening robber was twice as high when the victim complied as when he/she resisted forcefully. In contrast, Wells and Horney (2002) and Phillips and Maume (2007) claim that presence of a weapon can actually lead to an escalation of violence. Wells and Horney (2002) claim that guns, more than any other weapon, increase likelihood of attack because they empower individuals to attack without endangering themselves. As a result, those without the psychological inclination or physical ability to make an attack without a weapon have the potential to inflict damage from a distance.

3.5. Premeditated and impulsive violence

The role that the weapon plays in causing physical harm is both devastating and pervasive. While this harm is not always intentional (Kellermann et al., 1996), weapons are essentially designed to be used in anger. There is clear evidence that the public is fully aware of the increased capacity for causing harm associated with weapons (Harding, 1993; Wright & Rossi, 1986). This is a perception that informs the coercive elements of weapon-related behavior. Weapon use in causing harm has typically been thought of as a premeditated, planned behavior. However, many violent weapon related acts could be considered impulsive. An example of impulsive weapon use would be making use of an object in their immediate environment, such as a bottle, to attack another person. In contrast, premeditated weapon use involves the use of objects designed or adapted to cause harm and are usually brought to the scene of the incident by the perpetrator. These are very general descriptions of types of weapon use and inconsistencies often arise in actual violent altercations. For this reason, it is possible that the distinction between premeditated and impulsive weapon use represents an oversimplification of violence as it fails to consider contextual factors such as motivation for violence. Furthermore, Michie and Cooke (2006) found that impulsiveness was negatively related to nonweapon violence history, suggesting that nonweapon violent individuals were less impulsive than the weapon using and non violent prisoners in their sample. To date, no research has been conducted to investigate differences between impulsive and premeditated weapon users. This is most likely due to the erroneous belief that all weapon use is premeditated.

4. Weapon use at intergroup and interpersonal levels

Although effort has gone into explaining the costs and consequences of gun laws in the US, relatively little is known about US adults' motivations for carrying guns (Kleck & Gertz, 1998). Most attention has focused on adolescent weapon carrying in schools, which accounts for less than 1% of US homicides among those of school going age (Centers for Disease Control, 2008). While there is an abundance of information, both psychosocial and demographic, on antecedents of school attending weapon carriers, we know little about other groups such as adults, and those who have been excluded from, or do not participate in the education system. The generalizability of

high school studies are further limited through their reliance on short, superficial assessments of weapon related behavior, such as asking respondents about their weapon carrying over the preceding 30 days, and by not examining the consistency of individual's weapon carrying over time. Similar to the US, little is known about demographic or psychosocial characteristics of weapon carriers in the UK. In this section, we will discuss what is known of the demographic factors associated with weapon carrying in both the US and UK and will focus on a number of factors including: age, gender, socioeconomic status, substance misuse, social support, culture and norms, exposure to weapons, and weapon availability.

4.1. Demographic correlates of weapon use

4.1.1. Age

In the US, the age of highest prevalence of weapon carrying range from 13 to 16 years (DuRant, Krowchuk, Kreiter, Sinal, & Woods, 1999). Perhaps more importantly, the Rochester Youth Development Study, a longitudinal survey of youth criminal activity, found that reasons for carrying a firearm varied by age. Gun carrying was influenced by gang membership before the age of sixteen and by drug dealing after this age (Lizotte, Krohn, Howell, Tobin, & Howard, 2000). While further research is needed to establish reliability of these age specific motivations, this has important implications for preventive measures, and suggest ways for interventions to be more efficiently targeted towards different motivations and social situations across age groups. In one of the few studies of weapon related carrying among a UK sample, Barlas and Egan (2006) investigated determinants of weapon carrying in 121 British teenagers and found that the effect of age on weapon carrying (Age range 11–19 years) disappeared when controlling for delinquency.

4.1.2. Gender

Intuitively, male gender will be a significant predictor of weapon carrying, as males are typically more aggressive and "antisocial" than females (Archer, 1994). Analysis of a nationally representative sample of 6,504 US adolescents found that, after controlling for exposure to violence and violent victimization, male gender is one of the most significant risk factors for weapon carrying in schools (AOR 3.1, 95% CI 2.3–4.1; Kodjo, Auinger, & Ryan, 2003). Simon, Crosby, and Dahlberg (1999) also found that males were considerably more likely than females to carry weapons both off (AOR 8.07, 95% CI 6.27–10.39) and on school grounds (AOR 4.76, 95% CI 3.51–6.46). As with most predictors of weapon related behavior, the relationship is not straightforward. The gender effect of weapons has been shown to be mediated by social situations and by assailant characteristics. For example, an analysis of 369 police reported domestic violence incidents revealed that females were more than three times more likely than males to use weapons against their partners. Females also appear to respond differently to victimization. DeJong (1997) found that females were less likely than males to carry a weapon in response to violence. Area factors such as number of single parent households with adolescent children and a perception that local crime rates were increasing predicted weapon ownership among females. Motivations for weapon carrying and use may vary between genders, with females perhaps more likely to carry weapons for defensive purposes. This suggests that weapon violence prevention strategies would need to be tailored to suit the target group and their motivations for weapon carrying. Therefore, this area should be examined in considerably greater detail.

4.2. Socioeconomic factors

Socioeconomic status (SES) is negatively correlated with violent crime perpetration and victimization (Farrington, 1998), but the defensive potential of weapons suggests that the relationship

between weapon carrying and SES may be less well understood. In the US, Kodjo et al. (2003) found that neighborhood poverty and parental education that was less than or equal to a high school level were significantly associated with weapon carrying in school. However, once intrinsic (interpersonal connectedness, mental health, school connectedness and impulsivity) and extrinsic (perpetration of violence and violent victimization) factors were controlled for in the model, the significant effect of both these covariates on weapon carrying was lost. This position is supported by evidence from the Rochester Youth Development Study which also failed to find a relationship between gun carrying and income (Lizotte, Krohn, Howell, Tobin, & Howard, 2000).

4.3. Psychosocial risk factors

4.3.1. Substance misuse

Lizotte et al. (2000) state that: “those who use large quantities of drugs may need to carry guns for two reasons: they frequently confront dealers who are likely to be armed and they may need guns to commit crime for cash to buy drugs” (p.827). Association between guns and drug markets has been cited as a key factor in past increases in firearm related homicides in the US. This is known as the “Drug–Gun Diffusion Hypothesis” (Blumstein, 1995). While research by Lizotte et al. (2000) focused exclusively on firearms, other weapons should also be considered. DuRant et al. (1999) found that carrying a gun, knife or club in school were associated with tobacco, alcohol and substance use, the strongest associations being between weapon carrying and tobacco or marijuana use. Kulig, Valentine, Griffith, and Ruthazer (1998) and Kodjo et al. (2003) also report findings similar to these using an independently collected high school sample and AddHealth data, respectively. In a sample of incarcerated adolescents, Vaughn, Howard, and Harper-Chang (2006) found a positive relationship between level of polysubstance use and daily weapon carrying. Participants with high lifetime polysubstance use were significantly more likely than low lifetime polysubstance users to be daily weapon carriers (AOR 9.16, confidence intervals not reported) and moderate polysubstance users were also more likely to be daily weapon carriers (AOR 2.47, confidence intervals not reported). This relationship was also apparent in comparisons of episodic weapon carriers with noncarriers (AORs 1.68 and 1.23, respectively). Black and Ricardo’s (1994) study of substance related behaviors among low income African American youth also revealed a significant association between cigarette smoking and weapon carrying (AOR 4.11, 95% CI 1.35–13.46). The strongest substance related association with weapon carrying was drug trafficking (AOR 4.85, 95% CI 1.40–16.94).

There is little UK research on the relationship between substance misuse and weapon carrying, particularly in relation to systemic violence (Bennett & Holloway, 2004). McKeganey and Norrie (2000) found a dose–response relationship between number of illegal drugs used and likelihood of carrying a weapon in respondents aged range 11–16 years. Bennett and Holloway’s (2004) interviews with individuals arrested for crimes involving firearms in the UK revealed that the primary reason for possessing a gun was for protection during drug deals. Given the strength of the relationship in the US between substance misuse and weapon carrying, further research on the direct relationship between weapon carrying and substance misuse is required in both countries.

4.4. Social support

The relationship between weapon related behaviors and ‘social support’ is complex. Social support been cited by some as a risk factor for criminal activities (Powell, 1997), while others claim it is an important protective factor (Cowie & Olafsson, 2000; Malecki & Demaray, 2003). The two types of social support evident in these studies share a name, but the way in which this social support is

delivered and perceived differ considerably. Smith and Thomas (2000) and Morrison, Furlong and Smith (1994) present evidence that social support from adults is negatively related to violent behavior. The role of peer support, however, is less robust. Powell (1997) suggests that for vulnerable inner city youths, peer support contributes to violent behavior, while Morrison et al. (1994) found the converse – a high number of friends (peer support) was related to lower rates of violence. Peer group habits may protect or expose the individual to violence, e.g., gang membership may expose an individual to a greater risk of violent behavior than non gang members. It may be the case that the influence of levels of social support cannot be generalized, and each individual case be examined to assess the roles played by the various providers of social support.

4.5. Culture and norms

Tangential to notions of social learning and socialization in weapon use is the role of culture and social norms in reinforcing and supporting attitudes towards weapons. A culture of *obligatory* gun ownership, as is evident in Switzerland, should result in low rates of gun use in crime. Conversely, if a culture of inappropriate weapon use exists, then this may become a social norm in a population. This population can vary in size from a local area to an entire nation. It is difficult to determine whether a “culture” of weapon carrying and weapon use is developing in a society. What must be recognized is the evolving nature of weapons culture. As societies develop and change, so do the circumstances of violence. For example, when drug consumption increases in a society, so does the prevalence of systemic violence and weapon use (Blumstein, 1995). If weapon availability increases with the societal change, it proliferates and reinforces a culture of acceptable weapon use. Therefore, rates of weapon crime and attitudes towards weapons must be kept under constant surveillance within a society. Parallel to the term used in conflict studies, ‘technological determinism,’ offenders will adopt weapons that are more destructive and less detectable appear, they will quickly be adopted by offenders. *Social determinism*, the alternative to *technological determinism* is discussed briefly below.

4.6. Historical risk factors

4.6.1. Exposure to weapons and violence

An assumption in the cycle of violence hypothesis is that exposure to violence in early life is a risk factor for violent behavior in adolescence and adulthood. Therefore, early exposure to weapon use may lead to the acquisition of weapon related violent ‘scripts’ that direct an individual’s behavior in later potentially violent altercations. Murrell, Merwin, Christoff, and Henning (2005) asked a sample of US male perpetrators about intimate partner violence (IPV), whether they had witnessed interparental weapon threat/use and their own IPV weapon use ($n=362$). They found a significant relationship between witnessing weapon use as a child and actual domestic weapon use as an adult. However, failure to control for other factors, such as personality characteristics, in the relationship between the two variables limits the interpretability of the findings. In addition, Murrell et al. (2005) referred specifically to the role of the participants’ parents domestic weapon use in the social modeling of adult relationships, and did not consider other types of violence, nor did they investigate the impact of childhood weapon victimization on later weapon use. Henrich, Brookmeyer, and Shahar (2005) found that, among adolescents in a US longitudinal survey (AddHealth; Resnick, Ireland, & Borowsky, 2004), exposure to weapon violence and actual commission of weapon violence were predictive of each other. Controlling for demographic and socioeconomic factors, participants who reported exposure to weapon violence at Wave 1 of the study were 2.88 times as likely to report having committed a weapon offence at Wave 2 (one year later). Kodjo et al. (2003) also used

AddHealth study data and found that factors such as partner violence (AOR 4.0, 95% CI 1.3–12.3), perpetration of physical violence (AOR 2.5, 95%CI 1.4–4.2), witnessing violence (AOR 2.3, 95%CI 1.6–3.4) and having access to a gun (AOR 1.5, 95% CI 1.1–2.0) were all significant predictors of respondents carrying weapons on school grounds.

4.7. Weapon availability

The relationship between firearm availability and violence has been reviewed by [Hepburn and Hemenway \(2004\)](#). The authors suggest a strong positive relationship between firearm prevalence and homicide. In terms of gun control, criminologists, politicians, and policy makers disagree over the notion of displacement, or the “Substitute Weapon” ([Zimring, 1967](#)). The theory of the “Substitute Weapon” states that the prohibition of a particular type of weapon is futile as the motivated offender will simply find another weapon to achieve their goals ([Wolfgang, 1958](#)). [Zimring's \(1972\)](#) finding that that firearm caliber is positively related to lethal outcomes casts doubt over the validity of this argument as there degree of harm potential has been shown to vary with weapon type. An important message of [Hepburn and Hemenway's \(2004\)](#) review article is that, while a positive association exists between firearm prevalence and homicide, causation can not be inferred. This statement begs the question – to what extent does the harm potential of a technology influence homicide rates (*technological determinism*) and to what extent does rate of homicide in a population influence the proliferation of firearms (*social determinism*)?

5. Weapons and the individual

A number of historical and demographic risk factors for weapon carrying and weapon use has been cited above. While useful in describing particular groups that have increased risk of weapon related behavior, they do not offer insights into the cognitions and psychological characteristics of weapon users. The widespread prevalence of weapon carrying in the US has meant that, to some extent, this behavior has not been *pathologized* to the same extent as in the UK and other countries. Therefore, little work has been conducted to identify psychological characteristics that differentiate between weapon carriers or users and those that do not engage in this behavior. Research in this area has focused on the extreme end of the weapon behavior spectrum. Investigators have been interested specifically in *illicit weapon use* – assuming there is another kind of weapon use. Therefore, this field is not concerned with professional soldiers, police or other security professionals who use their weapons *'legitimately.'* Consequently, much of this research has been conducted with prisoner samples.

5.1. Perceptions of others' weapon carrying

An important consequence of a *'culture'* of weapon carrying is the perception by an individual that many of their peers are carrying weapons. [Bailey et al. \(1997\)](#) and [Williams, Mulhall, Reis, and DeVille \(2002\)](#) found that one of the best predictors for weapon carrying was the perception that others were carrying weapons. [Williams et al. \(2002\)](#) investigated handgun carrying among 22,000 6th, 8th, and 10th grade students in Illinois. They found that the likelihood of the participant having ever carried a gun increased with the number of their friends who they believed had carried a gun in the preceding year (one friend carried a gun: Adjusted Odds Ratio (AOR) 4.41, 95% CI 3.37–5.78; two to four of participant's best friends carried a gun: AOR 10.68, 95% CI 7.93–14.39). An unfortunate repercussion of carrying a weapon is that this perception has a normalizing function on behavior. As [Bailey and Hubbard \(1991\)](#) explain:

“Students who bring weapons to school assume or perceive that this behavior is common simply because they do it...the relation-

ship is likely to be reciprocal: others' behavior affects one's own behavior, and one's own behavior affects the perception of others' behavior” (p.267).

5.2. Fear of victimization

Increased fear of personal harm may increase the need for protection among those who do not have the confidence or physical ability to protect themselves from their perceived adversary resorting to carrying or using weapons. Studies in the US that have focused on weapon carrying as a result of ‘fear of crime’ mostly focus on weapons in schools (e.g., [Kingery, McCoy-Simandle, & Clayton, 1997](#); [DuRant et al., 1999](#); [Webster, Gainer, & Champion, 1993](#)). Self protection is repeatedly cited by American survey participants, both students ([Arria et al., 1997](#)) and adults ([Smith & Uchida, 1988](#)), as the principle reason for carrying a weapon. [Lemos \(2004\)](#) and [Bennett and Holloway \(2004\)](#) have noted this motive among UK weapon users. Conversely, [Lane et al. \(2004\)](#) investigated the intended likelihoods of low income African American adolescents to carry a knife or a gun ($n = 223$). They found that likelihood to carry a knife was strongly correlated with delinquent behavior, but not fear of victimization.

[Warr and Stafford \(1983\)](#) maintains that fear of crime stems from fear of the likelihood of victimization. Therefore, previous victimization would suggest a heightened fear of crime and consequently, an increased proclivity for weapon carrying. A survey of 294 inner city black adolescents indicated that students who had been threatened or attacked with a knife were 4.89 times more likely to carry a knife (95% C.I. 2.27–10.50) and 7.56 (95% C.I. 2.87–19.91) for males and females, respectively, compared to those who had not been threatened or attacked with a knife ([Webster et al., 1993](#)). [Bailey et al. \(1997\)](#) report that the factor ‘*victimization in school*’ was significantly correlated with weapon carrying in bivariate analyses, but this relationship was accounted for by other factors in a multivariate model of weapon carrying in schools ($n = 1507$).

There is an exception to the association between victimization and weapon carrying. In investigating weapon carrying in Swiss schools, [Kuntsche and Klingemann \(2004\)](#) found that “being bullied” or “being hit” was associated with weapon carrying among a “victim-offender” group. However, a cluster of students were identified who were at heightened risk of being violent and had a very high prevalence of weapon carrying, but were at relatively low risk of violent victimization. This suggests that the role of victimization and fear of victimization in influencing weapon related behavior varies according to attitudes to violence as well as a number of psychosocial and historical factors.

5.3. Aggression

Aggression is the principal focus of a large proportion of weapon behavior research. Studies on weapon carrying and weapon use by US adolescents have focused on participants' history of violence, seeing this as a necessary antecedent to weapon use. The limitation of considering weapon use as analogous to aggression (or its survey equivalent – *history of violence*), is that it fails to accommodate the complexity of weapon use as a behavior. However, [Michie and Cooke \(2006\)](#) have provided evidence to suggest that weapon related behaviors are more multidimensional than previously thought. Analysis of the structure of the MacArthur Community Violence Screening Instrument (MCVSI: [Steadman et al., 1998](#)) completed by Scottish offenders ($n = 250$) revealed that the instrument is comprised of two factors, best distinguished by weapon use in violence and absence of weapon use in violence. Weapon violence was associated with psychopathy, history of childhood violence and frequent aggressive fantasies. Violence without weapons was associated with anger and was inversely related to age ([Michie & Cooke, 2006](#)). The authors suggest that the use of a weapon may be a useful

proxy method of distinguishing between more severe and less severe violent offenders.

An analysis of the 1995 Youth Risk Behavior Survey data ($n=10,904$) by Simon et al. (1999) revealed that participants who had been in a physical fight off school grounds were more likely to carry a weapon off school grounds in the preceding 30 days (AOR 3.60, 95% CI 2.85–4.53) than those who did not carry weapons (Simon et al., 1999). This was also the case among those who carried a weapon on school grounds (AOR 3.11, 95% CI 2.37–4.07). In one of the few studies of disadvantaged black adolescents, DuRant, Getts, Cadenhead, and Woods (1995) found that frequency of weapon carrying was highly correlated ($r=0.33$) with physical fighting, with the relationship being stronger among males.

Williams et al. (2002) investigated students' attitudes to violence along with their reported weapon carrying. While likelihood of carrying a weapon in a variety of situations increased in an approximately linear fashion as participant's frequency of attacking someone "with intent to hurt seriously during past year" increased (p.555), there was no significant relationship between participants' ratings of "How wrong it is to be violent" and their weapon carrying history. Barlas and Egan (2006) found a similarly unusual effect of attitudes towards weapons among a sample of UK adolescents. A factor analysis of responses to the 12 item Juvenile Attitudes towards Weapons Scale revealed that the items loaded on three factors, which were named: "Offensive Weapons Carrying," "Defensive Weapons Carrying," and "Reactive Weapons Carrying." Surprisingly, having a positive attitude towards carrying a weapon (e.g. status display) was negatively associated with actually carrying a weapon, while aggressive identity was positively associated with weapon carrying. Barlas and Egan suggest that this counterintuitive finding may be the result of deceptive self reporting by weapon carriers. The second factor, "Defensive Weapons Carrying" was positively correlated with using a weapon to threaten or injure someone, but it did not act as a predictor of weapon carrying. The authors concluded that "neither self protection nor status display can be wholly put forward as a model of weapon carrying, and the only firm conclusion that can be drawn is that weapon carrying is driven by several motivations" (p.67).

5.4. Delinquency and early offending

The 'delinquency' construct is generally regarded as some combination of antisocial behaviors such as violence, substance misuse, gang membership and street crime. Williams et al. (2002) note that gang membership (AOR 2.18, 95% CI 1.67–2.83), number of arrests in the preceding year (AOR 2.03, 95% CI 1.57–2.63) and history of substance use (AOR 1.38, 95% CI 1.08–1.76) were predictive of ever carrying a weapon compared to those participants who had not engaged in these behaviors.

Particularly pertinent here is the relationship between early onset of offending and weapon related outcomes. Extensive research has been conducted into offending careers and the undesirable outcomes associated with earlier age of offending (Moffitt, 1993). McCluskey, McCluskey, and Bynum (2006) found that early onset of offending was a significant predictor of serious violent offences and gun related behavior. Offenders who had police contact before the age of fourteen were twice as likely to be arrested for an offence that involved a gun as those whose first police contact occurred after age fourteen. Similarly, our own research (Brennan, Shepherd, & Moore, in press) found a significant negative relationship between age of first conviction and likelihood of using a weapon among offenders.

5.5. Weapons and psychopathy

Psychopaths are one of the most researched groups within the field of forensic psychology. They are emotionally detached individuals, with high risk for engaging in antisocial and violent behavior (Hare,

1981), although not all psychopaths are violent. Hare and McPherson (1984) provide evidence that psychopaths are more violent and aggressive than other offenders, and that they commit a disproportionate number of crimes relative to other offenders. An analysis of criminal records of psychopaths ($n=73$), mixed psychopaths ($n=75$) and nonpsychopaths ($n=79$) in US prisons found that psychopaths had significantly more charges for possession of a weapon against them than nonpsychopaths and that psychopaths were significantly more likely to use a weapon than those in the mixed or nonpsychopath groups. However, the reliability of this finding remains in some doubt as Williamson, Hare, and Wong (1987) were unable to replicate these results. Michie and Cooke's (2006) study of Scottish offenders supports assertions of a link between psychopathy and weapon use. Psychopathy was found to discriminate between offenders with a history of weapon related violence and a history of violence that did not involve a weapon.

Reviewing the literature linking weapon use and psychopathy, Patrick and Zempolich (2002) conclude that the relationship may be the result of psychopaths' proneness towards instrumental violence, or perhaps recognition of the coercive utility of weapons. They claim that violence is disproportionately associated with the psychopathic coercively motivated weapon user, as the coercive use of a weapon will ideally avoid any violence. Of course, the prevalence of weapon carrying and weapon use is such that not all people who engage in this behavior are psychopaths. Simply, it is likely that psychopaths recognize the facilitative nature of weapons in achieving goals, be they acquisitive, violent or otherwise, but typically ignore the potential negative consequences of weapon related behaviors such as increased severity of punishment.

6. Prevention of weapon related behavior

Theoretical models that account for weapon use and weapon carrying are valuable as they offer a means of collecting together disparate factors that influence behavior and offer insights through which interventions can be formulated. However, evidence for successful interventions is sparse, in particular with regard to violence involving weapons other than firearms.

Methods for the prevention of weapon use have been largely informed by theories of situational crime prevention. Such interventions aim to limit exposure to and accessibility of weapons (supply side; e.g., Romero, Wintemute, & Vernick, 1998; Ozanne-Smith et al., 2004) while using increasingly punitive forms of deterrence (demand side; e.g., Violent Crime Reduction Act, 2006 (England and Wales)). One of the more successful weapon reduction programs has been Operation Ceasefire (Braga, Kennedy, Waring, & Piehl, 2001). This intervention combined *supply side* and *demand side* prevention techniques to considerably reduce firearm homicide in Boston. The program combined enhanced efforts to reduce firearm trafficking in the area with an intensive deterrence strategy, focused specifically on violent youth gangs. Reduction in a number of outcome measures, including number of homicides, reported gun assault incidents and police calls for shots fired, indicate that the project was successful in reducing gun related behavior in the city. It should be noted that an important element to the success of this intervention was a shift of the frame of reference for the project from "juvenile gun violence" to "gang-related violence." This suggests that targeting the process (e.g., gangs and subcultures of violence) may be more fruitful than targeting the medium of violence (e.g., weapons). This clearly needs to be investigated in greater detail.

While projects such as Operation Ceasefire have shown success in reducing gun violence in the short term, longer follow up periods are required to assess the effect of these interventions. The limited follow-up periods of many studies, often owing to limited project resources, need to be extended if the effectiveness of these projects is to be better understood. Empirical evaluations of effective programs can be greatly

informed by qualitative process evaluations that identify the idiosyncrasies, potential pitfalls and bespoke elements to interventions that have influenced their success with particular groups and areas. It is highly unlikely that there is a *one size fits all* intervention for the reduction of weapon violence.

In areas with more restrictive gun laws, such as the UK, knives feature more prominently than firearms as tools of violence (Kershaw et al., 2008). The almost universal availability of kitchen knives presents a problem for legislators and violence prevention specialists as potential for *supply side* prevention of knife use is severely limited (the right to purchase a knife is limited to those aged over 18 years and carrying any offensive weapons in public is prohibited, but no laws exist for the safe storage of knives). Concurrently, *supply side* prevention of firearm availability is extremely important in the UK to keep the number of firearms, legitimately obtained or otherwise, at a minimum. In the UK situation, the law is almost completely helpless to prevent the accessibility of knives. Consequently, legal and preventive frameworks shift from one of situational prevention to that of offender decision making processes (*demand side*). For example, in England and Wales, the Violent Crime Reduction Act 2006 doubled the maximum sentence for unlawful possession of a knife, representing an increasingly deterrence focused approach to weapon related behavior. Other weapon prevention programs have focused on what Wilkinson and Fagan describe as ‘scripts’ and aim to provide alternative, more appropriate responses to potentially violent altercations (Lemos, 2004). However, if the harmful consequences of weapon use go unrecognized, it is possible that the deterrent measures will also be of little importance to weapon carriers. This remains an area that requires considerable future research. A well designed intervention to target this behavior has yet to be conducted in the UK.

7. Conclusion

In summary of the review thus far, we present a basic diagram of the weapon carrying-weapon use pathway (Fig. 1). This pathway, a simple amalgamation of existing literature, serves to illustrate the various essential components of weapon related behavior. It is deliberately posed at a superordinate level to emphasize that the

relationship between many psychosocial, motivational and situational factors associated with weapon carrying and weapon use have yet to be investigated in detail. Therefore, the pathway should be interpreted as a working model which we hope will be enhanced by further research.

The physical and psychological pain associated with weapon violence is considerable. Given the facilitative part played by weapons in causing harm, it is surprising that this behavior has not attracted more worldwide research attention. Two aims of this review have been to demonstrate the idiosyncrasies of weapon related behavior and to emphasize the need for more detailed research into the factors and circumstances that promote weapon violence.

Given the complexity and often paradoxical associations with fear, aggression, coercion and expression, alongside the potential of weapons for facilitating violence and injury, weapon use needs to be understood not just as a corollary of violence, but as a behavior with its own dynamics, antecedents and consequences. Furthermore, weapon use needs to be understood within the wider social context of deprivation and subcultures of violence. Theories of weapon related behavior, such as the interpersonal model of Wilkinson and Fagan (2001) and the conflict resolution model of Gleditsch (1990) represent potentially fruitful methods of understanding illicit weapon related behaviors while informing violence prevention methods.

The focus on high school students may reveal some interesting correlates of weapon related behavior. However, the knowledge that can be gained from surveys with a specific group of adolescents is limited and is unlikely to provide answers to questions about how best to prevent weapon violence in the community. We maintain that multimethodological approaches focusing on motivations, weapon availability and psychosocial characteristics and the interactions between these factors all need to be further considered. Further research also needs to be conducted to determine whether weapon use is an indicator of distinguishing personality characteristics or is simply a behavior at the extreme end of the violence spectrum. Longitudinal studies are required that identify pathways of onset of and desistance from weapon related behavior. Similarly, detailed pathway models of weapon use are required to illuminate the situational and cognitive elements of the decision to use a weapon during a violent altercation. At present, weapon violence is only

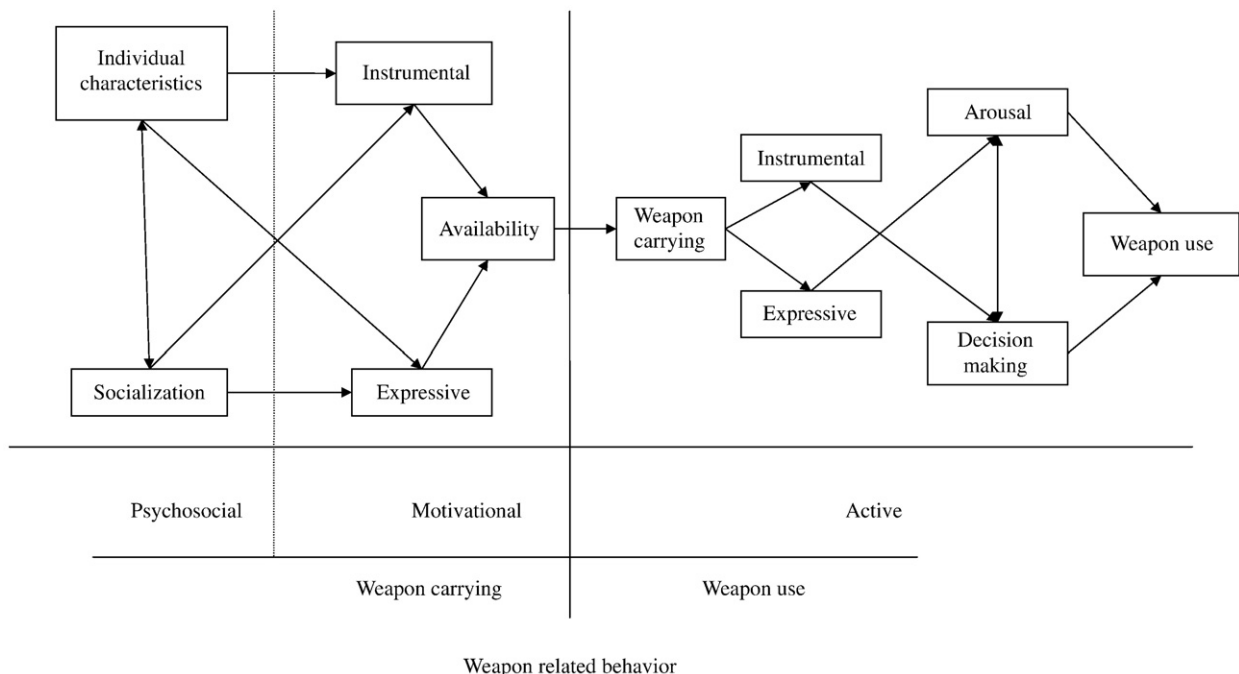


Fig. 1. Weapon carrying-weapon use pathway model.

understood at a superficial level. We believe that future violence prevention strategies will be greatly enhanced by a renewed, broadly focused and integrative investigation of the carrying and use of weapons.

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