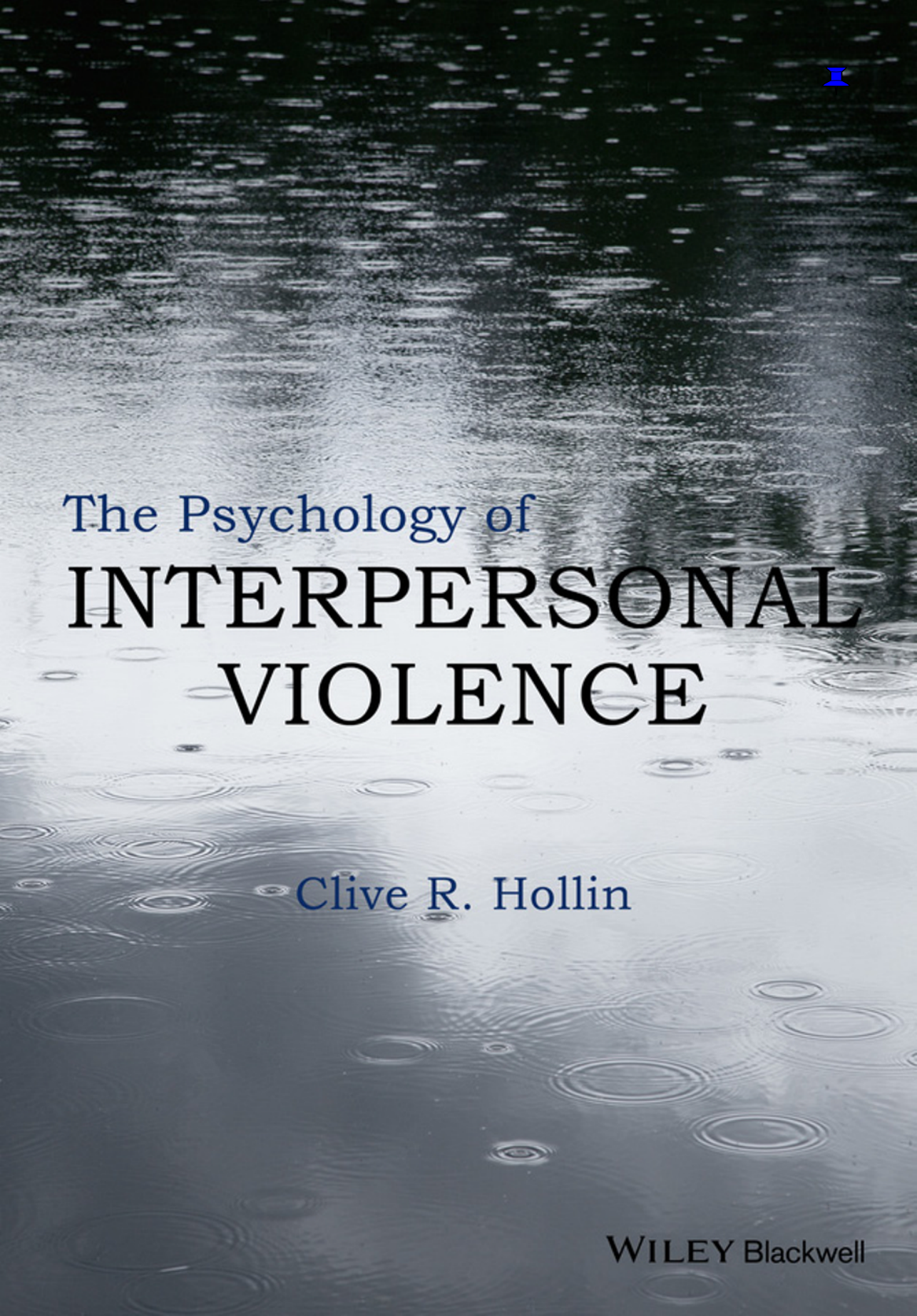
The Psychology of
INTERPERSONAL VIOLENCE
Clive R. Hollin
WILEY Blackwell

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For the late Arnie Goldstein, much missed friend

violence (n.). late 13c., "physical force used to inflict injury or damage" from Anglo-French and Old French *violence*, from Latin *violentia* "vehemence, impetuosity", from *violentus* "vehement, forcible"

Online Entomology Dictionary

The Latin word *vis* (strength, force, power)

MyEntomology.com

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Preface and Acknowledgements

This book has been in my head, as we psychologists say, for over two decades. I have a folder marked "Potential Ideas" which sits in a tray on my desk and into which I occasionally file my scribbled-down thoughts for books. The original jottings for a book on interpersonal violence are now looking rather yellowed. However, the outline in my folder is pretty well what has emerged at the end of writing, although there was one late addition which came in the form of Chapter 2. I included this chapter having been influenced by Arnie Goldstein's notion of "low-level violence". It is easy to be seduced by acts of extreme violence, which so readily capture one's attention, and skip by the low-level everyday violence in order to get to the serious stuff. The material in Chapter 2 reinforced my perception that some forms of violence have become so pervasive that we take them for granted as part of our everyday life. There was also a surprise in writing this chapter. In reading material, including green criminology texts, for the section of Chapter 2 given to cruelty to animals I thought deeply about my own feelings on this particular manifestation of violence. I have supported animal welfare charities for over 40 years, as it seems to me that animals, rather like young children, are the most elementary form of victim: they do not comprehend what is happening, they are often defenceless, and they are unable to respond effectively against we humans with our many personal and technological advantages. It's really not a fair fight. However, I would argue, as long as we are prepared to tolerate cruelty to animals, we are also able to tolerate the harm caused by other forms of low-level violence such as bullying and corporal punishment.

*

I should like to acknowledge some personal and academic debts. Although he does not know it, my old friend Kevin Howells taught me a great deal about the personal qualities inherent in the type of academic I have tried to be over my career. The vision of blending theory with research in order to inform practice is, when done

well, a wonderful thing. I have been fortunate in knowing personally two academics who can do this better than most. The first is the late Don Andrews, who heavily influenced my own thinking and research. The second is the late Arnie Goldstein, to whom I have dedicated this book. Arnie was simply inspirational: he encouraged me in my efforts as a fledgling psychologist and later I knew him personally and worked with him. I defy anyone to find a better role model for an applied psychologist.

On a personal note, I have just retired from academic life. I had thought that my last book, the second edition of *Psychology and Crime* which was published in 2013, would be my swan song before I spent more time with my garden but this one came along. However, the trouble with writing is that as it goes along so it keeps suggesting new projects and I've just scribbled a note in my file. I'll have a word with the nice people at Wiley and then we'll see how we go.

Finally, to borrow from attachment theory, I know that I need a "safe base" to function effectively. My partner in life, Felicity Schofield, has provided me with that base for longer than we care to remember.

Clive R. Hollin
Leicester

1

Interpersonal Violence

Violence is a part of all our everyday lives. We read about violence in our morning newspaper, we hear about it in the daily news on the radio and television. We read murder mysteries for fun and play computer games that involve mayhem and death. Krug, Mercy, Dahlberg, and Zwi (2002) make the observation that "About 4400 people die every day because of intentional acts of self-directed, interpersonal, or collective violence. Many thousands more are injured or suffer other non-fatal health consequences as a result of being the victim or witness to acts of violence" (p. 1083). The accompanying costs are played out in the short-term costs of treating victims and helping families while the longer-term costs may be felt by victims whose lives are irrevocably changed and by the costs incurred in bringing the aggressor to justice.

We also know that violence comes in many shapes and forms. A report published by the World Health Organization (WHO; Krug et al., 2002) refers to three distinct classes of violence: first, *self-directed violence* as with suicide and self-harm; second, *interpersonal violence*, which is taken to be physical or sexual violence against a family member, a partner, or within the broader community; and third, *collective violence* in the sense of violent acts by large groups of people or by states such as so-called ethnic cleansing, terrorism, and war.

It is the second of the WHO classes of violence, *interpersonal violence*, which is of concern here.

What exactly is meant by the term *interpersonal violence*? "Interpersonal" can be understood in its literal sense to mean between people; however, "violence" is a little more problematic. The word "violence" is often used interchangeably with "aggression". However, aggression is not the same as violence and it is used differently according to context. In everyday use we use aggression as an adjective to help

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describe certain forms of behaviour: we may say that a football team has an aggressive style of play, which is very different to saying a team has a violent style of play. In ethology the term "aggression" may be used in the sense of an instinct which, given the right environmental stimuli, leads to fighting between members of the same species (Lorenz, 1966). Tinbergen's (1948) famous study of the three-spined stickleback provides an example of instinctive aggression. Tinbergen showed that when a male stickleback is faced with a strange male intruding into its territory, it is the perception of the intruder's red colouration which is the key stimulus that releases aggression in the territorial male. It seems that at some seaside resorts (I took the picture below near Filey in Yorkshire) the birdlife has become overly aggressive.

Source: Picture © Clive R. Hollin.

It is possible that, like sticklebacks, humans have evolved to possess an aggressive instinct that may help explain human conflict (LeBlanc & Register, 2003). However, unlike sticklebacks, for humans there are the complicating factors of the powerful influence of previous learning together with our cognitions in the form of appraisals of the situation and our personal intentions. Siann (1985) is helpful with the suggestion that with respect to interpersonal transactions the term "aggression" refers to the *intention* to hurt another person but without necessarily causing any physical injury. In a similar vein, Anderson and Bushman (2002) state that "All violence is aggression, but many instances of aggression are not violent. For example, one child pushing another off a tricycle is an act of aggression but is not an act of violence" (p. 29). This latter view suggests a continuum that stretches from aggression at one end to violence at the other: Anderson and Bushman suggest the tipping point from aggression to violence is reliant upon the associated level of harm: "*Violence* is aggression that has extreme harm as its goal (e.g., death)" (p. 29).

Yet further, an important distinction may be drawn between *reactive aggression* and *proactive aggression* (sometimes called *hostile aggression* and *instrumental*

aggression respectively). The term "reactive aggression" refers to impulsive acts of violence in which the aggressor's psychological state is dominated by a negative affect such as anger. On the other hand, "proactive aggression" refers to premeditated acts of violence, typically carried out to achieve a personally satisfying goal such as financial gain or revenge (Polman, Orobio de Castro, Koops, van Boxtel, & Merk, 2007). As Babcock, Tharp, Sharp, Heppner, and Stanford (2014) point out, the terms "impulsive violence" and "premeditated violence" are also in use, with some overlap with reactive and proactive. The reactive/proactive distinction will be used here, acknowledging that other terms may carry similar if not identical meanings.

Thus, we can arrive at the understanding, as used in this text, that interpersonal violence is the direct, often face-to-face, actions of an individual, including acts of neglect, which inflict emotional, psychological, and physical harm on other people. These acts of violence may be carried out with premeditation or in the heat of the moment.

The complexity of violence has led to various theories from disciplines ranging from anthropology to zoology (Mider, 2013). However, an overview of contemporary *psychological* accounts of *interpersonal violence* provides the starting point here.

Psychological Accounts of Interpersonal Violence

There are several theoretical models with a psychological emphasis which have been formulated to provide an account of interpersonal violence. These various models seek to explain acts of interpersonal violence by drawing together in a cogent way a variety of psychological and social factors. In addition, there is a range of biological factors, although these are typically associated with aggression generally rather than interpersonal violence specifically (e.g., Farrington, 1997; Olivier & van Oorschot, 2005; Tiihonen et al., 2010; Umukoro, Aladeokin, & Eduviere, 2013).

In the first psychological model, shown in streamlined form in Figure 1.1, Bandura (1978) describes a tripartite system, based on social learning theory, that relates to the *origins*, *instigators*, and *regulators* of aggressive behaviour.

Origins of aggression →	**Instigators of aggression** →	**Regulators of aggression**
Observational learning	Modelling	External reinforcement
Reinforced behaviour	Aversive treatment	External punishment
Innate factors	Perceived consequences	Vicarious reinforcement
	Instructional control	Vicarious punishment
		Self-reinforcement
		Self-punishment

Figure 1.1 Bandura's Social Learning Model of Aggression. Source: After Bandura, 1978.

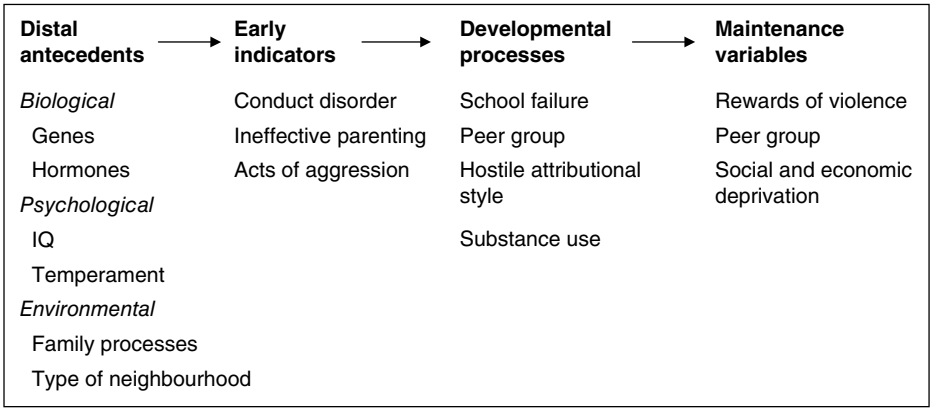

Figure 1.2 Developmental Model of Violence. Source: After Nietzel et al., 1999.

The model of the aetiology of violent behaviour presented by Nietzel, Hasemann, and Lynam (1999), also drawing on behavioural theory, describes four stages in the development and maintenance of violent behaviour. As illustrated in Figure 1.2, this model progresses through the lifespan identifying the various types of biological, psychological, and social risk factors which may be present at different times.

There is, not surprisingly, a reasonable degree of overlap between these two models: for example, Bandura's *innate factors* are congruous with Nietzel et al.'s *biological antecedents*, while the importance given by Bandura to reinforcement as a *regulator* of behaviour is mirrored in Nietzel et al.'s *maintenance variables*. As noted by Nietzel et al., the evidence base for the importance of the different variables is varied in strength, as is the evidence for the strength of relationships between the variables both within and across stages. Finally, there may be more than one pathway through the model so that individual differences in constitution and experience produce several combinations of variables which may be important in different circumstances.

The General Aggression Model (GAM), as formulated by Anderson and Busman (Anderson & Bushman, 2002; DeWall, Anderson, & Bushman, 2011), places an emphasis on the individual taking part in a social interaction that culminates in a violent act. The GAM views social interactions as a sequence of exchanges, each of which is termed an *episode*, involving verbal and nonverbal behaviour. The main components of the GAM, not unlike other models, consist of *inputs* from the person and the situation, the person's internal affective and cognitive state which is the *route* through which the input information is processed, and finally the *outcomes* of appraisal and the nature of the individual's decision on how to act.

These psychological models all highlight the importance of three, interconnected, areas: first, the formative factors in an individual's development which are associated with the likelihood of violent conduct; second, the environments in which violence occurs; and third the psychological and social processes which occur during the act

of violence. However, before looking at these three areas in more detail, there is one more variable to consider, the gender of the violent person.

Gender

Inspection of the criminal statistics reveals that there is a gender divide as far as crime, including violent crime, is concerned (Ministry of Justice, 2010a). It is clear from the criminal statistics that men are significantly more involved in crime, including violent crime, than women. However, while a man or a woman may be convicted of the same violent crime, it does not follow that the factors associated with the development and maintenance of that violent act are identical for men and women (Collins, 2010; Putallaz & Bierman, 2004). It is likely that there are some background factors, such as poverty and harsh parenting, which are common to violent men and to violent women, and some gender-specific factors such as prosocial attitudes and emotional problems (Hollin & Palmer, 2006; Manchak, Skeem, Douglas, & Siranosian, 2009).

Crick and Grotpeter (1995) suggest that there is a relationship between gender and *type* of violence. They note that research typically finds that male children use physical aggression to a degree not seen in female children. However, they make the point that just because young girls do not hit, the assumption cannot be made that they are not aggressive; rather, the aggression may take forms other than hitting. Crick and Grotpeter note in support of their hypothesis that girls' aggression is often *relational* rather than *physical*: relational aggression is characterised by attempting to harm other children by damaging their friendships, excluding them from social activities and social groupings, and by spreading false stories so leading to the child's rejection by other children.

Cross and Campbell (2011) make a similar point about older age groups: men are more likely than women to use severe forms of violence such as kicking and punching which inflict physical injury. When the form of violence shifts to less physically aggressive acts, such as hurtful gossip and persistent teasing, so the gender difference is lost. An American study reported by Zheng and Cleveland (2013) compared the developmental trajectories of young men and women, aged between 15 and 22 years, with regard to acts of both violent and non-violent delinquency. They reported that at lower levels of delinquency there were only minimal variations in delinquency between the genders. However, at the higher levels of delinquency, which Zheng and Cleveland called *chronic*, the delinquent acts were violent in nature and perpetrated by males. It is highly likely that the higher number of men in the criminal justice system is a natural consequence of this gender variation although, parenthetically, it seems unlikely that prison has any effect on the recidivism of either men or women (Mears, Cochran, & Bales, 2012).

The role of gender will appear as appropriate in the following chapters. Attention now returns to the three areas—developmental factors, environment, and psychological and social processes related to the act of violence—highlighted by psychological models of interpersonal violence.

Development of Violent Behaviour

The most powerful way to study behavioural development is by employing a longitudinal research design. The essence of a longitudinal design is that a group of people, usually referred to as a *cohort*, is followed up over a long period of time, typically decades, with periodic measures of a range of variables associated with the behaviour of interest. There is a tradition of using longitudinal research to study the development of violent behaviour (Farrington, 1989).

McAuliffe, Hubbard, Rubin, Morrow, and Dearing (2006) found evidence for the temporal stability of both reactive and proactive aggression. Those individuals whose aggression was evident in childhood and continued into adulthood had poorer outcomes, in terms of both social functioning and criminal offences, than those whose aggression ceased during adolescence. A Canadian longitudinal study reported by Temcheff et al. (2008) covered a 30-year span, from school age into early adulthood, and investigated male and female violence within the family. The males who were aggressive as children showed stable levels of aggression as time passed: they moved from aggression towards peers at school to violence towards partners and children in adulthood. The level of childhood aggression evident for those females in the cohort who became mothers was predictive of their violent behaviour towards their own children. The strongest predictors of violent behaviour included low levels of educational attainment and a punitive parenting style.

Huesmann, Dubow, and Boxer (2009) conducted a longitudinal study investigating the continuity of physical aggression with a cohort of males and females. They monitored acts of aggression through peer report of mildly aggressive acts, such as pushing and shoving, alongside self-report of more serious acts such as punching, kicking, and weapon use. Huesmann et al. reported a moderate degree of continuity of aggression, more distinct for males than for females, from 8 years of age to adulthood. Kokko, Pulkkinen, Huesmann, Dubow, and Boxer (2009) compared data from longitudinal studies carried out in Finland and America: they reported that in both countries and for males and females the level of aggression displayed as a child was a significant predictor of physical aggression as an adult. Finally, the literature review carried out by Piquero, Carriaga, Diamond, Kazemian, and Farrington (2012) came to the conclusion that for some adult offenders aggression is a stable behaviour over the course of the lifespan as traced back to childhood.

The overall conclusion to be drawn from this body of research is clearly expressed by Huesmann et al. (2009): "One of the most consistent findings in aggression and criminology research is that aggression is a relatively 'stable,' self-perpetuating behavior that begins early in life" (p. 136). This point is reinforced still further by the findings of a meta-analytic study reported by Ttofi, Farrington, and Lösel (2012) which showed that involvement in acts of bullying at school was a strong predictor of perpetration of acts of violence in later life.

However, it is not the case that aggressive children are randomly distributed across society: it has long been understood that antisocial and criminal behaviour, including violent behaviour, runs in families. A body of research has looked at the

characteristics of families that engender violent conduct. (The issue of family violence is also considered in Chapter 2 with respect to corporal punishment, throughout Chapter 3, and familial sexual violence is included in Chapter 4.)

Families

Farrington, Jolliffe, Loeber, Stouthamer-Loeber, and Kalb (2001) considered three generations—fathers, mothers, sons, daughters, uncles, aunts, grandfathers, and grandmothers—in a study of the concentration of offending by boys aged 8, 11, or 14 years, within a sample of 1,395 American families. In keeping with previous research conducted in the UK (Farrington, Barnes, & Lambert, 1996), Farrington et al. reported a high concentration of offending in families: indeed, less than 10% of the families in the study accounted for over 40% of all those who were arrested. While all relatives had some predictive power with respect to boys' offending, it was the father's offending which was the strongest predictor. This pattern of findings has been consistently replicated by studies using samples drawn from a range of populations (e.g., Bijleveld & Wijkman, 2009; Putkonen, Ryynänen, Eronen, & Tiihonen, 2007; Thornberry, Freeman-Gallant, & Lovegrove, 2009). It remains to be established whether the continuity of violence across generations is mainly a function of heredity and associated biological functioning, environment, or, as is more likely, a combination of these factors (Craig & Halton, 2009; Niv, Tuvblad, Raine, & Baker, 2013; Tzoumakis, Lussier, & Corrado, 2014).

Cycles of violence Widom (1989a) used the phrase "cycle of violence" to describe the continuity of violence through families and across generations. In particular, Widom's research (Kazemian, Widom, & Farrington, 2011; Maxfield & Widom, 1996; Widom, 1989a, 1989b; World Health Organization, 2007) has focused on the child's experience of neglect and violent abuse within their family and how such childhood experiences may act to increase the risk of their future antisocial and violent behaviour.

The focus on experiences across the lifespan is congruent with the second stage of the model proposed by Bandura (see Figure 1.2) where *aversive treatment* is nominated as one of the factors which instigates aggression. Yet further, also consistent with Bandura's model, it is likely that the abused child will witness violence both between their parents and between their parents and siblings (Holt, Buckley, & Whelan, 2008; Roberts, Gilman, Fitzmaurice, Deckerf, & Koenen, 2010). The child's observations of family violence serve both to model violence, with parents being particularly potent behavioural models, and to reinforce vicariously the potency of violence as an effective short-term means of dealing with interpersonal problems. One of the potential consequences for the child of this type of family background is an increased risk of developing problematic behaviours, including violence, as they grow through adolescence and adulthood (McCord, 1983). This issue is considered further in Chapter 3, as we now move to the environmental side of the equation.

Violent Places

Wherever people gather there is the potential for interpersonal violence. These potential settings for violence may be as intimate as the family home, as detached and impersonal as a crowd of commuters, or even a setting as seemingly unlikely as clinical medical practice (Hills & Joyce, 2013). There are several physical qualities of the immediate environment which are associated with an increased likelihood of violence.

Bystanders

The presence of a small number of other people, usually referred to as *bystanders*, at the scene may either inhibit or increase the likelihood of interpersonal violence (Levine, Taylor, & Best, 2011). This "bystander effect" is discussed below in the context of the transactions that lead to violence.

Crowds and crowding

The role of crowds in relation to violence can be thought of in two ways: first, there are crowds that assemble with the intention of committing acts of collective violence; second, there is the effect on the individual of the experience of being in a crowded space.

Violent crowds As described by de la Roche (1996), violent crowds come in a variety of guises each seeking different goals through the use of collective violence. There are, de la Roche suggests, four common types of collective violence—*lynching*, *rioting*, *vigilantism*, and *terrorism*—which all serve the crowd's aim of seeking to right a perceived wrong.

Physical crowding and violence It is known that humans have around them an area of *personal* or *defensible* space (Dosey & Meisels, 1969) which is a distance of approximately an arm's length, although the exact distance varies from culture to culture. If anyone intrudes into our personal space we find it stressful and we seek either to move away personally or to push the other person away. When we are in a crowd our personal space is invaded which, depending on the nature of the occasion, may make us anxious and hyper-alert for any signs of hostility which may threaten our wellbeing.

The relationship between crowding and violence is clearly seen in studies of closed environments such as institutions. The advantage of conducting a study in an institutional setting is that many institutions have an established capacity and so it is possible to measure overcrowding with a reasonable degree of precision. Thus, a study by Ng, Kumar, Ranclaud, and Robinson (2001) conducted in a psychiatric

inpatient unit in New Zealand was able to calculate the degree of crowding in the unit according to the percentage of beds occupied. Ng et al. report a higher average occupancy when a violent incident, particularly an act of verbal aggression, took place than when there were no incidents. This crowding effect was independent of the ratio of staff to patients, although violence was significantly more likely to occur between 3 p.m. and 11 p.m.

A similar Finnish study by Virtanen et al. (2011) looked at violent incidents over a five-month period in 90 inpatient wards within 13 acute psychiatric hospitals across Finland. They found that almost one-half of the wards were overcrowded as measured by bed occupancy. In those wards that were overcrowded there was a significantly higher likelihood of a violent assault on hospital staff. Thus, explanations for aggression in institutions for psychiatric patients should not ignore situational and environmental factors (Peluola, Mela, & Adelugba, 2013; Welsh, Bader, & Evans, 2013).

Prisons are another type of institution where crowding may take place and is easily measurable according to the Certified Normal Accommodation (CNA) level. In England and Wales the CNA is the population level which the Prison Service accepts as commensurate with a decent standard of accommodation for prisoners. It follows that if its CNA is exceeded so a prison become officially overcrowded and, in turn, it may be predicted that the risk of violence increases accordingly.

However, establishing a definitive link between prison overcrowding and escalation of violent incidents is not straightforward. As Wooldredge and Steiner (2009) point out, there is a large range of variables—from type of prison, the nature of the prisoner cohort, and the research design—that may influence the degree of correspondence between prison crowding and numbers of violent incidents. In this light it is not surprising that an extensive literature contains a mixture of positive, negative, and null findings. For example, an American study by Gaes and McGuire (1985) looked at assault rates in 19 federal prisons and found that crowding had a marked effect on assault rates. In contrast, another large-scale study of 150 American prisons by Tartaro and Levy (2007) found that it was the racial composition of the prison population together with the level of prison officer supervision that best predicted violence.

Temperature

As humans we respond to the weather generally as seen, for example, in the impact of weather on daily mood (Denissen, Butalid, Penke, & van Aken, 2008). A relationship between hot weather and violence is implicit in everyday speech: we anticipate the likelihood of violence when we describe people as "hot under the collar" or "hot headed" or having a "fiery temper" and we are familiar with the notion of "hot spots" for crime. Indeed, such is the power of speech that even using words that we associate with violence can act to increase our aggressive thoughts and hostile perceptions of other people (DeWall & Bushman, 2009).

At one level the relationship between heat and aggression is very basic in nature: as it becomes hotter so the potential for violence increases accordingly. This principle extends across the animal kingdom: for example, a study of spiders by Pruitt, Demes, and Dittrich-Reed (2011) found that "At warmer temperatures *A. studiosus* exhibit diminished tolerance of conspecifics, increased activity levels, shorter latencies of attack, and increased tendencies to attack multiple prey items" (p. 318).

There is ample evidence of a similar relationship between heat and violent behaviour in humans as well as arachnids, although it is sometimes couched in terms of seasonality and crime rather than temperature and crime (e.g., Harries, Stadler, & Zdorkowski, 1984). In a typical study, carried out in Philadelphia, Song and Taylor (2011) found a significant association between temperature and number of robberies. However, as with the complexities that are evident for the link between crowds and violence, this association was attenuated by several variables, as Song and Taylor explain:

> Locations that were near major or moderate sized commercial venues, with moderate or upper income communities located there or nearby, and in some instances well served by subway lines (Center City, University City, South Street, Chestnut Hill, Roxborough), seemed to experience the strongest temperature-linked oscillation in robbery counts. Some of these communities contain or are near venues that are year-round tourist attractions more heavily visited in warmer months, or that are sites of special seasonal events such as runs, concerts, or festivals. (p. 468)

The relationship between physical violence and temperature is not restricted to street crime. A study by Larrick, Timmerman, Carton, and Abrevaya (2011) showed an interaction between temperature and sporting aggression. Larrick et al. analysed data from 57,293 Major League baseball games to look at the relationship between provocation and temperature in precipitating aggressive acts. They found that "Higher temperatures interacted with a greater number of teammates being hit by a pitch to increase the chances of a pitcher subsequently hitting an opposing batter" (p. 425). Thus, when temperatures are high the probability of a pitcher hitting an opponent rises, but this relationship is significantly dependent upon whether or not one of the pitcher's teammates has been hit previously by an opposition pitcher. Larrick et al. suggest that it is likely that set within the hot environment, the pitcher's retaliatory decision to hit an opponent is influenced by both their own anger and the promptings of their teammates.

Thus, the effects of temperature on behaviour are in part associated with social factors such as transient crowding, as when people gather for festivals and sporting events, or with the times when people leave work and begin to travel home and so congregate at stations for railway and underground services. Indeed, thinking more broadly, temperature itself is not independent of other influences: the weather is clearly reliant upon the season of the year while, as those of us who live in England know only too well, the summer temperature in one country may be very different from that in another country. There is corresponding evidence, from several

countries, to suggest that factors such as weather and season are related to local crime rates generally and to violence specifically (Breetzke & Cohn, 2012; Ceccato, 2005; Hipp, Bauer, Curran, & Bollen, 2004). In this vein of thought, some commentators have extrapolated from our current understanding to speculate on the impact of climate change on crime (Gleditsch, 2012; Scheffran, Brzoska, Kominek, Link, & Schilling, 2012).

How does temperature influence violent behaviour? There are several explanations for the relationship between heat and violence (Anderson, 1989), but the one which has attracted a great deal of attention is based on the GAM. This explanation holds that that rising levels of heat bring about physiological changes that increase the likelihood of violent behaviour in a linear fashion (Bushman, Wang, & Anderson, 2005). In other words, there is a one-to-one direct, linear relationship so that as heat rises so too does violence.

Does the potential for violence keep on increasing as the temperature rises further and further? It appears that the linear relationship between crime and temperature may hold only to a certain point. The *negative affect escape model* suggests that when it becomes very hot the individual's concern is with escaping from the unpleasantness and the discomfort brought about by the rising heat resulting in the net effect of *less* crime (Bell & Baron, 1976). Thus, the linear relationship between temperature and violence becomes curvilinear beyond a certain point.

Combinations of environmental variables

The effects of environmental variables on human behaviour generally and violence specifically are not straightforward. While there may on occasions be a relationship between both crowds and violence and crowding and violence it is evident that this relationship is attenuated by a wide range of factors. Thus, it cannot be assumed that crowds automatically equal violence, nor can the possibility of violence be discounted when crowds gather. Similarly, as shown by the study of baseball pitchers, previous events and teammates' comments act to fuel heat-driven acts of aggressive retaliation. The interactions between the various environmental influences that may prompt violence add to the complexities of understanding violence and predicting exactly where and when it is likely to occur.

Weapons

There is an inescapable association between weapons and interpersonal violence. Indeed, the mere presence of a weapon during a violent interaction is sufficient to prime aggressive thoughts among those involved, in turn heightening the chances of the weapon being used (Bartholow, Anderson, Carnagey, & Benjamin, 2005). As will be discussed in Chapter 4, it is axiomatic that the use of a weapon in a violent