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Cyber Violence: Towards a Predictive Model Drawing Upon Genetics, Psychology and Neuroscience

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Abstract

The following paper outlines the latest incarnation of Owen's (2014) evolving, meta-theoretical, *Genetic-Social* framework, and the intention is to illustrate the explanatory potential of the sensitizing device, in particular meta-constructs such as *the biological variable* (the evidence from behavioural genetics for an, at least in part, biological influence upon human behaviour), *psychobiography* (the unique, asocial, inherited aspects of the person such as disposition), and *neuro-agency* (a new term which acknowledges the influence of neurons upon human 'free-will'), in the task of conceptualising cyber violence. In what follows, cyber violence is reconceptualised, moving the definition beyond the usual notion of gendered online violence towards a broader conception which incorporates hate trolling, cyber-terrorism, predatory online sexual 'grooming' and so on. It is the contention here that the synthesis 'applied' to cyber violence via *flexible causal prediction* may be of use to criminological theorists, social policy-makers and practitioners working in the field of the criminal justice in the task of constructing predictive models of cyber violence.

Introduction

In what follows, an updated version of Owen's (2014) *Genetic-Social*, meta-theoretical framework which has been employed in over 20 publications is briefly outlined and certain meta-constructs are 'applied' to the study of online violence. On September 24th 2015, the International Telecommunications Union, an agency of the United Nations, published a report on 'Cyber Violence Against Women and Girls: A World-Wide Wake-Up Call'. The report, which at the time of writing (November, 2015) has been formally retracted, appeared to define 'cyber violence' in terms of 'online trolling' and 'online hate-speech' targeted at women and girls. It is contended here that we need to conceptualise 'cyber violence' in broader terms. Cyber violence can be regarded as behaviour by an actor which takes place online and which is hostile and aggressive, and which may also be offensive, indecent, obscene, or of a menacing character. The victims can be of any background with regard to age, gender, ethnicity, sexuality or social class. Such cyber violence can be found within both the 'known' parts of cyberspace- the social media sites, forums, chat rooms and 'normal' webpages indexed by conventional search engines, and the 'dark net', which 'has come to mean the encrypted world of Tor Hidden Services', where users cannot be traced, and cannot be identified' (Bartlett, 2015:3). The intention here is to illustrate the explanatory potential of the framework, in particular meta-constructs such as *the Biological Variable* and *Psychobiography*, in conceptualising cyber violence, and to construct an ontologically-flexible model of cyber violence which may be of help in predicting such behaviour. The

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term, the *Biological Variable* refers to the evidence from behavioural genetics and neuroscience for an, at least in part, biological basis for some human behaviour. *Psychobiography* refers to the unique, asocial aspects of the person such as inherited disposition. Another particular meta-construct from the framework plays a key role here and that is the notion of *Neuro-Agency*. This term is employed in preference to the standard term 'agency' in order to acknowledge the role of neurons in human free-will. In the course of examining cyber-violence through the *Genetic-Social* lens of the *Biological Variable* and inherited *Psychobiography*, we consider evidence from Tiihonen et al (2014) for the role of CD H13 and MAO-A genes in violent behaviour; evidence for the role of disinhibition in violence from Suler (2004) and Spiegel et al (2009); evidence for the role of anti-social personality disorder and de-individuation in violence from Bishop (2013) and Buckels et al (2014); evidence for the role of cortisol in aggression from Martin (1997); and evidence for links between an under-developed prefrontal cortex in teenagers with impulsivity which may be linked to violence in the work of Eagleman (2011). The approach employed here is interdisciplinary in the sense that the conceptual toolkit draws upon criminological theory, sociological theory, the philosophy of Heidegger, behavioural genetics, the neuroscience of free-will and evolutionary psychology. This post-Postmodern, ontologically-flexible framework represents an attempt to 'build bridges' between the biological and social sciences and suggests a way in which criminological theory might move beyond its four main theoretical obstacles. It is contended here that interdisciplinary research and collaboration which seeks to 'build bridges' between the biological and social sciences is of great benefit to the development of Realist, post-Postmodern criminologies and 'aspects of our intellectual life that are complicit in the stagnation of critical criminology' (Owen, 2014: 4).

As Owen (2014:1) suggests, 'these obstacles are the nihilistic relativism of the postmodern and poststructuralist cultural turn; the oversocialised gaze and harshly environmentalist conceptions of the person; genetic fatalism or the equation of genetic predisposition with inevitability (Owen, 2009, 2012) and bio-phobia (Freese et al, 2003), that appear to dominate mainstream criminology; and the sociological weaknesses of many so-called biosocial explanations of crime and criminal behaviour (see, for example, Walsh and Beaver, 2009; Walsh and Ellis, 2003), which, although dealing adequately with biological variables, appear to neglect or make insufficient use of meta-concepts such as agency-structure, micro-macro and time-space in their accounts of the person. The term, *Genetic-Social* is adopted in order to further distance the framework from hardline Sociobiology, and to reflect a hopefully more up to date and balanced account of the mutuality and plasticity between the biological and the social.

The beginnings of the *Genetic-Social* framework lie in Owen's (2006, 2007a, 2007b) earlier attempts to expand Sibeon's (2004) *anti-reductionist* framework from a focus upon agency-structure, micro-macro and time-space to include a 'new' focus upon biological variables, reflecting his interest in behavioural genetics. This has led to the current incarnation of the framework and the addition over time of ten 'new' meta-constructs, applied to the study of human biotechnology (Owen, 2009), crime and criminal behaviour (Owen, 2007b, 2012, 2014). In what follows, we briefly examine the sensitizing device.

Genetic-Social Framework

The *Genetic-Social* framework arises out of a critique of the following 'cardinal sins' of illegitimate theoretical reasoning:

1) Reductionism. Reductionist theories are ones which attempt to reduce the complexities of social life to a single, unifying principle of explanation or analytical prime mover such as 'the interests of capitalism', 'patriarchy', 'rational choice', 'the risk society', 'globalization' and so on.

2) Essentialism. Essentialism is a form of theorising that in aprioristic fashion presupposes a unity or homogeneity of social phenomena. This can include social institutions, or taxonomic collectivities such as ‘white men’, ‘the middle class’ etc.

3) Reification. Reification is the illicit attribution of agency to entities that are not actors or agents. An *actor* is entity possessing cognition that, in principle, has the means of formulating, taking and acting upon decisions. Therefore, ‘the state’, ‘society’, ‘white people’ etc are not regarded as *actors*.

4) Functional Teleology. Functional teleology is an invalid form of analysis involving attempts to explain the causes of social phenomena in terms of their effects, where ‘effects’ refers to outcomes or consequences viewed as performances of functions. If there is no evidence of intentional planning by actors ‘somewhere, sometime’, then it is a teleological fallacy to engage in explication of the causes of phenomena *in terms of their effects*, for example the concept of ‘institutional racism’ drawn upon in the MacPherson Report into the death of Stephen Lawrence (Owen, 2014).

5) Relativism. Relativism is a philosophical stance associated with Poststructuralism (Foucault, 1980a, 1980b) and Post-modernism (Lyotard, 1984). Arguably, relativists reject foundationalism from which theories can be generated, and fail to provide acceptable epistemologies and viable theories. The most basic criticism of Foucault’s relativistic position is that he never applies it to himself, to his own theories and conceptual frameworks. Foucault is open, that is to say, to the *self-referential objection* which posits that, if all theories are the product of a particular situation, then so too is *that* theory, and it therefore has no universal validity. To put it another way, if truth and falsity do not exist in an absolute sense, then Foucault’s thesis about the relativity of all knowledge cannot be ‘true’ in this sense. In arguing the way he does, Foucault is surely employing the very criteria of truth and validity which he claims are culturally relative. He is, in a sense, employing reason to try to prove the inadequacy of reason; claiming to provide a universally valid and ‘true’ explanation of why there is no such thing as a universally valid and ‘true’ explanation. Put simply, the Poststructuralist and Postmodern statement that there can be no general theory, is itself a general theory (Owen, 2009, 2012, 2014).

6) The Oversocialized Gaze. The meta-concept of the oversocialised gaze refers to harshly ‘environmentalist’ accounts which are characterised by a strong antipathy towards genetic, or partially genetic explication. Examples include Foucauldian arguments to the ends that sexuality is a ‘learned script’ (Owen, 2014).

7) Genetic Fatalism. Genetic Fatalism refers to a widespread tendency within social science to *equate genetic determinism with inevitability*. Arguably, it is a mistake to view the genes involved in human behaviour as immutable. Genes can be ‘switched on’, and external events- or free-willed behaviour- can ‘switch on’ genes (Owen, 2009).

8) Emotive Aversion. Emotive aversion refers to a tendency, especially prevalent within the left/liberal consensus that dominates UK-based Criminology, towards emotionally-charged, knee-jerk ‘yuk reactions’ to ‘controversial’ subjects ranging from the bio-phobia of reactions against attempts to marry genes and environment to cloning (Owen, 2009).

9) Incantatory Language. The metatheoretical framework can be said to be **anti-incantatory** in the spirit of Alain Robbe-Grillet (1963) and to some extent Heidegger (2010) in the sense of a ‘theory of pure surface’ and repugnance felt towards visceral, analogical and incantatory language of the sort which often characterises theories of hegemony, the idea of ‘the state as crimogenic’ and so on (Owen and Owen, 2015).

In addition to these ‘cardinal sins’, the ‘sensitizing device’ focuses upon the following metatheoretical formulations or **meta-concepts**:

1) Agency-Structure. The framework utilises a non-reified conception of *agency*, in which actors or agents are defined as entities that are, in principle, capable of formulating and acting upon decisions. *Structure* refers to the ‘social conditions’, or the circumstances in which actors operate, including the resources that actors may draw upon. *Structure*, then, may refer to discourses, institutions, social practices and individual/social actors. However, the new term **Neuro-Agency** (Owen and Owen, 2015) is now favoured over the earlier **Agency**. This is to acknowledge the work of those such as Dennett (1981) and Dennett et al (2007) whose Compatibilist/Soft Determinist work strongly supports the notion of the neuroscience of free-will. The framework adopts an adaptionist, **Neural Darwinist** approach to human agency which posits that morality evolved.

2) Micro-Macro. This meta-construct refers to the units of and scale of analyses concerned with the investigation of varying extensions of time-space. *Micro* and *Macro* should be viewed as distinct and autonomous levels of social process.

3) Time-Space. Time-space refers to significant but neglected dimensions of the social, and reflects concerns with temporality and spatiality. Classical social theorists such as Durkheim have tended to regard time as ‘social time’, distinct from a ‘natural essence’. However, the question of how differing time-frames—including those associated with the macro-social order and those with the micro-social-interweave is a complex matter that relates to debates pertaining to *dualism* versus *duality*.

4) Power. The framework acknowledges the *multiple* nature of power. Power exists in more than one form, in particular, there are objective structural (including systemic) forms of power, and agentic power. The latter term refers to the partly systemic and partly relational and potentially variable capacity of agents to shape events in a preferred direction. This is a *modified* notion of Foucauldian *power*, which recognises the *dialectical* relationship between *agentic* and *systemic* forms of power; the *relational*, *contingent* and *emergent* dimensions of power, and the concept that, *contra* Foucault, aspects of power can be ‘stored’ in positions/roles (i.e. that of a judge or police officer) and as social systems/networks (Owen, 2014).

5) Dualism. The framework favours dualism rather than notions of duality of structure. Foucault’s work, for example, has a tendency to compact *agency* and *structure* together instead of treating them as dualisms. This Foucauldian tendency collapses distinctions between the two resulting in *central conflation*. Here it is recommended that *agency* and *structure* and *biology* and *the social* should be employed as dualisms that refer to distinct, relatively autonomous phenomena. That is not to deny the mutuality and plasticity between the biological and social realms but rather to acknowledge that there may be times when we wish to study each sphere of influence separately (Owen, 2014).

6) Intermittent Gewissen. This Heideggerian term refers to the idea that ‘the call of conscience’ is intermittent.

7) The Biological Variable. The meta-construct refers to the evidence from evolutionary psychology, neuroscience and behavioural genetics for an, at least in part, *biological* basis for some human behaviour. For example, sexuality, language acquisition, reactions to stress and so on. Here, we should keep the notion of ‘nature via nurture’ firmly in mind. This refers to the ‘feedback loop’ which embraces both genes and environment, acknowledging plasticity and mutuality. Genes predetermine the broad structure of the brain of *Homo Sapiens*, but they

also absorb formative experiences and react to social cues (Owen, 2006, 2009, 2012, 2014). Recent cogent work by Tiihonen et al (2014) pertaining to links between severe violent, criminal behaviour and MAOA and CD H13 genotypes in a cohort of Finnish prisoners is a possible 'biological variable' within multifactorial analysis.

8) Psychobiography. The meta-construct was originally coined by Derek Layder to refer to the largely unique, asocial components of an individual's dispositions, behaviour, and self-identity, these being aspects of the individual that are relatively independent of face-to-face interaction and the macro-social sphere. In his foreword to Owen's (2009) *Social Theory and Human Biotechnology*, Layder states that, 'I fully concur with Owen's 'extension' of the implications of the notions of psychobiography to embrace the mutuality and plasticity of the relations between genetic and environmental influences'.

9) Dasein. From Heidegger, meaning being-there, human being, being human. Heidegger uses 'Dasein' to refer both to the concrete human being and to its (abstract) being human. The term is employed in the framework usually to refer to an entity, the human being.

10) Neuroplasticity. The term is from neuroscience and refers to the concept that life experiences reorganise the human brain.

11) Embodied Cognition. This is another concept from neuroscience which conceives of the human mind as the product of the brain, the body and interactions in the outside world.

12) Product. The concept that behaviour requires an actor 'acting' in an environment, and that the actor is the *product* of the genes, which are influenced by external events and *Neuro-Agency* absorbing formative experiences, and which 'build' the nervous system integrated within the actor productive of behaviour.

In what follows, we examine some selected examples of theoretical explanations for forms of cyber-violence from Suler (2004), Bishop (2013) and Buckels et al (2014) in addition to some selected explanations for aggression (Martin, 1997; Tiihonen et al, 2014) and impulsivity (Eagleman, 2011), which are here deemed relevant to the task of conceptualising forms of cyber violence, and we consider the possibility of synthesising some of the insights from these diverse explanations with meta-concepts from the *Genetic-Social* framework in a cautious attempt to point a possible 'way forward' towards a predictive model of cyber violence. The task here is to prepare the ground for further meta-theoretical and empirical investigation based upon large-scale synthesis involving models of flexible causality and flexible ontology.

Forms of Cyber Violence and Some Possible Explanations

The psychologist, John Suler (2004) studied the behaviour of participants in online chatrooms noting that participants tended to display greater anger and aggression in cyberspace than they did offline. He argued that this was because, 'when protected by a screen, people feel that real-world social restrictions, responsibilities and norms don't apply' (Bartlett, 2015: 8). Whether real or imagined, anonymity may allow people to explore their identities but it also may 'allow' them to act without fear of being held to account for their behaviour in a realm where responsibilities, norms and social restrictions may not apply. Suler called this, 'The Online Disinhibition Effect'. He examined six factors 'that interact with each other in creating this online disinhibition effect', which are dissociative anonymity, invisibility, asynchronicity, solipsistic introjection, dissociative imagination and minimisation of authority (ibid: Abstract). Suler chose not to conceptualise disinhibition as the revealing of, 'an underlying 'true self', but rather as, 'a shift to a constellation within self-structure involving clusters of affect and cognition that differ from the in-person constellation' (ibid). This disinhibition

effect may manifest itself as ‘toxic disinhibition’ in situations where people, ‘visit the dark underworld of the Internet- places of pornography, crime, and violence- territory they would never explore in the real world’ (ibid: Abstract). Interestingly, there is some evidence for a link between disinhibition and a disruption of the orbitofrontal circuit, which according to Spiegel et al (2009) has been treated successfully with carbamazepine.

Buckels et al (2014: Abstract) recently examined trolling and found that there were, ‘overall strong positive associations emerged among online commenting frequency, trolling engagement, and troll identity, pointing to a common construct underlying the measures’, and that both of their studies, ‘revealed similar patterns of relations between trolling and the Dark Tetrad of Personality: trolling correlated positively with sadism, psychopathy and Machiavellianism’. Trolling has, according to Bartlett (2014: 20), become, ‘shorthand for any nasty or threatening behaviour online’. With this in mind, it is interesting to read Bishop’s (2013) recent work on the de-individuation of the internet troller, and his ‘interview with a Hater’. Bishop (ibid: Abstract) suggests that the interview, ‘makes it apparent that there are a number of similarities between the proposed anti-social personality disorder in DSM-V and flame-trolling activity’. Bishop (2013: 29) identifies deindividuation, ‘a psychological state where inner restraints are lost when individuals are not seen or paid attention to as individuals’, as part of the depersonalization and decreased sense of self-identity, self-awareness, and self-control in ‘Hater’ trolls. Bishop (ibid: 46) usefully constructs a ‘Trolling Magnitude Scale’, suggesting that if such instruments are adopted, ‘it will make it easier for the police and other law enforcement authorities to prioritise who is prosecuted in an objective way’. He makes a cogent point when arguing that the law enforcement agencies, ‘need to get a grip, and take action against flame-trollers only when set thresholds are met and not in response to media-led public opinion’ (ibid). As Bishop also correctly suggests, an important step following the identification of which examples of trolling are ‘offensive’ is ‘trying to understand why some of the most prolific trollers act the way they do’ (ibid: 45). Clearly, in relation to the particular ‘Hate’ troller interviewed by Bishop, there is evidence provided on nearly every criteria of DSM-V ‘to support the claim that the psychopathy of Internet trollers resembles those with personality disorders’ (Bishop, 2013: 45). The author goes on to ponder whether ‘Haters’ have average abilities, and whether their resentment of ‘those who excel from being Hi-Functioning Empathics or Hi-Functioning Autistics’ results from their ‘wanting to be the best at everything and instead being the best at nothing’ (ibid: 46). In other words, these neurotic and psychotic symptoms could be, ‘an outcome of a failure to choose between excelling in life as an empathic, or indeed as an autistic’ (ibid). This, in Bishop’s view, is not the ‘fault’ of the ‘Hater’ but rather the result of the historically unique, high demands placed upon people in 21st century society. A long-term solution, Bishop (ibid) ponders, is perhaps for neuroscientists to, ‘force the evolution of the brain’. There may be times when it is an advantage to be empathic, such as when socialising, and times when it is an advantage to be autistic, such as when engaged in studying.

These examples of explanations for aspects of cyber violence, rooted in psychology, can arguably be synthesised with examples of *the biological variable* favoured as a meta-concept in the *Genetic-Social*, metatheoretical framework. For example, Bishop’s (2013) work which, as we have seen above, usefully links ‘Hate’ trolling with DSM-V, includes impulsivity as a notable characteristic of such offline offenders. There is convincing evidence from Eagleman (2011) for a link between impulsivity in teenagers and under-development of the pre-frontal cortex of the brain. Not all ‘Hate’ trollers are teenagers, and indeed Bartlett (2014) provides examples of prolific offenders who are much older, but a sizeable proportion of trollers are teenagers. It may be possible to include *the biological variable* of an, at least in part, neurological explanation for the impulsive behaviour displayed by some teenage trolls. As Eagleman (2011: 122) puts it, ‘the human prefrontal cortex does not fully develop until the early 20s, and this fact underlies the impulsive behaviour of teenagers’.

Additionally, it may be possible to link the psychologically-based observations of those such as Suler (2004), Buckels et al (2014), and Bishop (2013) in relation to cyber violence with further examples of *the biological variable*; that of the recent work on MAO-A

and CD H13 genes linked to aggression in the work of Tiihonen et al (2015). Links between the first gene, MAO-A and aggression first came to attention in 1993 via the study of a family in the Netherlands in which the men were, 'inclined to violently deviant behaviour, such as impulsive aggression, arson, attempted rape and exhibitionism' (Wade, 2014: 55). The eight men concerned carried an unusual form of the MAO-A gene in which a single mutation causes the cell's assembly of the MAO-A enzyme to be stopped halfway through, making it ineffective. As a result of this absence of functioning MAO-A enzymes, neurotransmitters grow in excess, which is linked to overaggression in social contexts (Anholt and Mackay, 2012).

Tiihonen et al's (2015: Abstract) more recent work covers both MAO-A and CD H13 genotypes in a group of Finnish prisoners and cogently suggests that in the developed countries, 'the majority of all violent crime is committed by a small group of antisocial recidivistic offenders', but until recently 'no genes have been shown to contribute to recidivistic violent offending or severe violent behaviour such as homicide'. However, the results of Tiihonen et al's study of two independent cohorts of Finnish prisoners, 'revealed that a monoamine oxidase A (MAO-A) low-activity genotype (contributing to low dopamine turnover rate) as well as the CD H13 gene (coding for neural membrane adhesion proteins) are associated with extremely violent behaviour (at least 10 committed homicides, attempted homicides or battery)' (ibid). Tiihonen and colleagues found that, 'no substantial signal was observed for either MAO-A or CD H13 among non-violent offenders, indicating that findings were specific for violent offending, and not attributable to substance abuse or antisocial personality disorder' (ibid). For the researchers, these results indicate 'both low monoamine metabolism and neuronal membrane dysfunction as plausible factors in the etiology of extreme criminal violent behaviour' (ibid). It is argued here that it may be possible to include MAO-A and CD H13 genotypes as *biological variables* in metatheoretical analysis of cyber violence drawing upon flexible ontology and multifactorial explanations. Tiihonen's study does not venture into cyberspace as an arena for criminality but it is possible that some offenders engaging in extreme examples of cyber violence, such as 'Hate' trolling, cyber-bullying and cyber-terrorism (such as attempts by ISIS's hackers to attack key targets in increasingly interconnected western cities and thus potentially bringing them to a standstill) may indeed carry such genotypes.

The *Genetic-Social* framework employed here posits that 'nurture' depends upon genes, and genes require 'nurture'. To reiterate, genes predetermine the broad structure of the brain of *Homo Sapiens*, absorb formative experiences, react to social cues and can be 'switched-on' by agentic behaviour and environmental stimuli. For example, stress can be caused by the outside world, by impending events, by bereavements and so on. Short-term stressors, 'cause an immediate reaction in the production of norepinephrine and epinephrine hormones responsible for increasing the heartbeat and preparing the human body for 'fight or flight' in emergency situations' (Owen, 2014: 2-3). Stressors that have a longer duration may activate a pathway that results in a slower but more persistent increase in cortisol. Cortisol can suppress the working of the immune system. Thus, those who have shown symptoms of stress are more likely to catch infections because an effect of cortisol is to reduce the activity and number of white blood cells or lymphocytes (Becker et al, 1992). As Martin (1997) shows, cortisol does this by switching on genes, and it only switches on genes in cells that possess cortisol receptors, which have in turn been switched on by environmental stimuli, such as stress caused by bereavement. Cortisol is secreted in the first place because a series of genes such as CYP17 get switched on in the adrenal cortex to produce the enzymes necessary for making cortisol. There are some very important implications here which inform the attempts to construct *Genetic-Social* conceptualisations and explanations of cyber violence. For example, Filley et al (2001) have linked elevated levels of norepinephrine with aggressive criminal behaviour. Hostile behaviour can be induced in humans by increasing plasma levels of norepinephrine, whereas agents that block norepinephrine receptor cells can reduce violent behaviour (ibid). Again, *the biological variable*, in this case, the role of cortisol levels in violent criminal behaviour may be drawn upon in multifactorial, metatheoretical theorising in

relation to cyber violence. It is certainly possible that the behaviour of some offenders is, at least in part, related to cortisol levels.

The *Genetic-Social* approach to cyber violence acknowledges that crime may be socially-constructed in the sense that, 'human actors ascribe meaning to the world, but that there is still a reality 'out there', in the sense that environmental conditions are potential triggers of genetic or physiological predispositions towards behaviour that may be labelled criminal' (Owen, 2014: 3). However, that does not mean that behaviour should be viewed as reflecting an inherited, pre-written script that is beyond individual control. The hardline neural determinism of Eagleman (2011) in which there appears to be a rejection of the notion of free-will is challenged here. The *Genetic-Social* framework utilises the term *Neuro-Agency* to acknowledge the influence of neurons upon human agency but further research will have to be conducted before there can be any abandonment of the idea that human beings are reflexive agents who, 'possess the agency to choose not to engage in criminal activities where they believe that their actions will harm others and offend ethico-social codes, or where the rewards are outweighed by negative consequences (Owen, 2014: 3). Agency, in turn, is influenced not only by morality or reason but also by inherited, constitutional variables. An inherited, impulsive disposition whether the result of an under-developed prefrontal cortex (Eagleman, 2011), anti-social personality disorder (Bishop, 2013), or a reflection of unique, asocial *psychobiography* which may not 'fit' any existing typology (Owen, 2014), may predispose an actor to formulate and act upon potentially criminal decisions. In *Genetic-Social* theorising, notions of *the biological variable* and unique *psychobiography* must be considered as one element within multifactorial explanations of crime and criminal behaviour alongside a critique of *neuro-agency* and *structure, time-space*, modified notions of Foucauldian *power* and other meta-concepts codified earlier. To recap, behaviour such as cyber violence requires an actor 'acting' in an environment, in this case cyberspace. The actor can be conceptualised as the *product* of the genes, which are impacted upon by external events, *neuro-agency*, and absorb formative experiences, required to 'build' the nervous system integrated within. An actor may be also conceptualised as a conscious, sentient being capable of formulating and acting upon decisions. As Owen and Owen (2015) recently made clear, this definition is at odds with the reified accounts of agency favoured in *Posthuman Agency* theories and *Actor-Network* theories. The *Genetic-Social* framework draws upon the concept of *Dasein* from Heidegger (2010), which views the human being not as an isolated subject removed from the world of objects that it desires knowledge of. For Heidegger, humans are beings who are, 'always *already in the world*, and in the main we do not distinguish ourselves from this world' (Owen and Owen, 2015: 23). In Heideggerian terms, being is time, to be a human being is to exist temporally between birth and death. This idea of the human actor as a being capable of contemplating its own finitude is greatly at odds with the reified concept of the 'merged' hybrid between human actor and technology favoured in Brown's (2013) concept of *Virtual Criminology*. The actor, in this case, an offender engaged in criminal cyber violence, has *embodied cognition*, that is to say the mind is the *product* of the dynamic interaction between the brain, the body and external influences in the world. Again, there is a link here to the ideas of Heidegger in the sense that the criminal offender experiences the world by interacting with it, and in this criminal context that may involve engaging in threatening, offensive or terrifying behaviour, and that thinking involves putting things to 'use'.

Building a Possibly Predictive Model of Cyber Violence

To recap, the *Genetic-Social* metatheoretical framework draws upon notions of multifactorial analysis, a flexible Realist ontology, and notions of flexible causality, rejecting reductionist, unitary explanations. It is contended here that it may be possible to utilise the framework in an attempt to build a possibly predictive model of cyber violence. Cyber violence, as has hopefully been made clear, is regarded here as online behaviour on the part of an actor which is situated either on conventional social media sites or the dark net and which is hostile and

aggressive, and may also be offensive, obscene, indecent or of a menacing character. This may include phenomena such as ‘Hate’ trolling, online ‘grooming’ and sexual predation, cyber terrorism and so on. It is argued here that we need to expand the rather narrow definition of cyber violence favoured by the International Telecommunications Union (2015) to span a wider spectrum of behaviour which includes the aforementioned phenomena alongside violence which is specifically aimed at women and girls. As we have seen previously, the metatheoretical framework arises out of a critique of the following illicit forms of theoretical reasoning; *reductionism, reification, essentialism, functional teleology, emotive aversion, incantatory language, the oversocialised gaze, relativism, and genetic fatalism.*

As we have also seen earlier, the framework draws upon notions of *the biological variable* and *psychobiography* in metatheoretical analysis. In this context, we may regard *the biological variable* as including the evidence for a role for cortisol in aggression (Martin, 1997), the role of an under-developed pre-frontal cortex in teenagers in impulsivity (Eagleman, 2011), and the role of CD H13 and MAO-A genotypes in aggression (Tiihonen et al, 2014). *Psychobiography* refers to unique, asocial aspects of the person such as disposition, and in some cases, this behaviour may not ‘fit’ neatly into existing typologies of behaviour. In other cases, the unique criminal behaviour may be combined with patterns of behaviour that are typical of the subgroup to which the offender belongs. Included under the dispositional umbrella of *psychobiography*, are the Machiavellianism, sadism and psychopathy identified by Buckels et al (2014), the anti-social personality disorders identified by Bishop (2013). These elements are possible causal variables that we might combine with Suler’s (2004) online disinhibition effect, and notions of *time-space, micro-macro* and *neuro-agency-structure* in multifactorial analysis. Owen and Noble (2015) recently employed Noble’s notion of *Causal Probability* in an attempt to ‘apply’ Owen’s notion of flexible ontology and multifactorial analysis to issues around conflict. Here it is contended that Owen’s meta-concept of *Flexible Causal Prediction* (FCP) is employed in conceptualising cyber violence as it might more accurately describe the anti-reductionist approach of *Genetic-Social* theorising. If we were to employ a *Genetic-Social* approach to cyber violence we would need to keep firmly in mind that the metatheoretical framework which informs it relies upon an anti-reductionist approach which rejects simplistic, unitary explanations for complex phenomena. We are employing meta-theory here, which is primarily concerned with ontological questions and reliant upon methodological generalisations. The intention is to inform and possibly improve the construction of substantive theory and the design of empirical field research. In using *Flexible Causal Prediction* or *FCP*, the researcher using the framework would be able to gain a picture of the *most likely* combination of variables in an explanation of the cyber violence of an individual offender. Here, the intention is to cautiously point a possible way forward which might inform the approaches of those who seek to conceptualise and possibly combat cyber violence.

Concluding Observations

It is the contention here that we need to widen the definition of cyber violence to include a much broader spectrum of hostile and aggressive behaviour in cyber space. As has been hopefully demonstrated here, it may be possible to arrive at a predictive model of cyber violence if we draw upon the multifactorial analysis favoured in the *Genetic-Social* metatheoretical framework, avoiding the ‘cardinal sins’ of illicit theoretical reasoning, drawing upon the array of meta-concepts outlined above in the manner of a ‘toolkit’, and applying the meta-concepts via a Realist approach which relies upon FCP or *Flexible Causal Prediction*. This synthesis may be of use to criminological theorists, makers of social policy and practitioners in the field of criminal justice. To reiterate, *Genetic-Social* meta-theorising serves to prepare the ground for further theoretical and empirical investigation and this entails large-scale synthesis.

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