Dying for the group: Towards a general theory of extreme self-sacrifice

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Abstract

Whether upheld as heroic or reviled as terrorism, throughout history people have been willing to lay down their lives for the sake of their groups. Why? Previous theories of extreme self-sacrifice have highlighted a range of seemingly disparate factors such as collective identity, outgroup hostility, and kin psychology. This paper attempts to integrate many of these factors into a single overarching theory based on several decades of collaborative research with a range of special populations, from tribes in Papua New Guinea to Libyan insurgents, and from Muslim fundamentalists in Indonesia to Brazilian football hooligans. These studies suggest that extreme self-sacrifice is motivated by 'identity fusion', a visceral sense of oneness with the group resulting from intense collective experiences (e.g. painful rituals or the horrors of frontline combat) or from perceptions of shared biology. In ancient foraging societies, fusion would have enabled warlike bands to stand united despite strong temptations to scatter and flee. The fusion mechanism has often been exploited in cultural rituals, not only by tribal societies but also in specialized cells embedded in armies, cults, and terrorist organizations. With the rise of social complexity and the spread of states and empires, fusion has also been extended to much larger groups, including doctrinal religions, ethnicities, and ideological movements. Explaining extreme self-sacrifice is not only a scientific priority but also a practical challenge as we seek a collective response to suicide terrorism and other extreme expressions of outgroup hostility that continue to bedevil humanity today.

1. Introduction

Willingness to sacrifice one's life for the sake of a group has been documented all around the world and throughout human history, from the Christian martyrs of antiquity to the followers of Jim Jones in Guyana, from the Spartans at Thermopylae to the kamikaze pilots of Japan. In recent decades, a murderous form of self-sacrifice – 'suicide terrorism' – has become increasingly common, with an estimated 3,500 such attacks recorded in the past thirty years (McCauley 2014). The Victorian scholar Emile Durkheim (1897 [1951]) argued that 'altruistic suicide' in all its forms was a consequence of overintergration of the individual into the group, to an extent that abnegated even the most basic self-interest for the sake of the larger collective. In the ensuing century, social scientists tried to break down the idea of 'overintegration' into more precise and testable theories of group alignment and identity (e.g. Tajfel and Turner 1979; Swann et al. 2012), psychological kinship (e.g. McNamara & Henrich 2016), and parochial altruism (e.g. Bernhard et al. 2006). But the relationships between these constructs and their underlying causes have, until recently, been quite unclear. This paper sets out a more encompassing theoretical framework, drawing on an extensive programme of empirical research into the causes and consequences of 'identity fusion' – a visceral sense of oneness with the group (Swann et al. 2012) – that has been linked to extreme self-sacrifice in a wide range of special populations, ranging from Muslim fundamentalists in Indonesia to armed insurgents in Libya, and from football hooligans in Brazil to tribal warriors in Melanesia. For highly fused individuals, the boundary between personal and group identity is porous and an attack on the group is taken personally. Identity fusion is highly correlated with an expressed willingness to fight and die to defend the group against external threats (Swann et al.

2010, 2014; Whitehouse et al. 2014). It is argued here that enduring fusion with the group results from perceptions of shared essence, established via at least two distinct pathways (see Figure 1).

One pathway involves undergoing transformative experiences with other group members (e.g. life-changing ordeals) that shape the personal and group identities of participants (Whitehouse 2013). To the extent that such shared experiences are remembered as distinct episodes, prompting subsequent reflection, they form part of one's personal life history while also being group-defining (Jong et al. 2015). Some emotionally intense experiences take the form of collective rituals, orchestrated in culturally prescribed ways (Kavanagh et al. 2017). Highly arousing rituals, because they are causally opaque, can generate prolonged processes of reflection and meaning-making, contributing to the elaboration of both personal and group identities (Richert et al. 2005). Initiations, for example, are explicitly designed to transform novices permanently, often by putting them through shared traumatic ordeals that are never-to-be-forgotten and rich with symbolism and semantic connotations (Barth 1987; Whitehouse 1996).

A second pathway to fusion entails the perceived sharing of essentialized biological properties with the group in the form of inherited phenotypic characteristics (Park & Schaller 2005). Recent studies have shown that identical (monozygotic) twins report higher levels of fusion with each other than their non-identical (dizygotic) counterparts (Vázquez et al. 2017). Further, it has been shown that fusion with twin mediates the impact of zygosity on a range of measures of prosociality and that identical twins are more likely to prioritize each other even over their children on

questions probing willingness to engage in self-sacrificial behaviour (Vázquez et al. 2017: 15). While phenotypic matching happens naturally among family members who share genetically transmitted physical or behavioural traits, it can also be triggered by norms and terminological practices emphasizing familial ties, e.g. referring to group members as 'brothers' or 'sisters' and emphasizing obligations of kinship and common ancestry (Swann et al. 2014).

Group bonding based on perceptions of shared essence among individuals who know each other personally may be described as 'local fusion' (Swann et al. 2012; Whitehouse 2013). This type of fusion is strongly associated with willingness to fight and die when the group comes under attack. In a study of revolutionary groups in Libya, many of whose members laid down their lives during the 2011 insurgency, local fusion emerged as a more powerful cohesive force than bonds with larger group categories, such as revolutionaries in general or supporters of the revolution (Whitehouse et al. 2014). When combined with perceptions of outgroup threat, high levels of local fusion are capable of motivating extreme self-sacrifice for the group. Gaddafi's forces in Libya presented a very obvious mortal threat to rebel groups in the region but outgroup threat can also play an important role in less deadly forms of intergroup conflict. For example, for highly fused supporters of football teams, rival supporters trigger perceptions of outgroup threat that motivate high-risk behaviours such as fan violence and hooliganism, as revealed by recent studies with diehard fans in several countries (Newson et al. In prep).

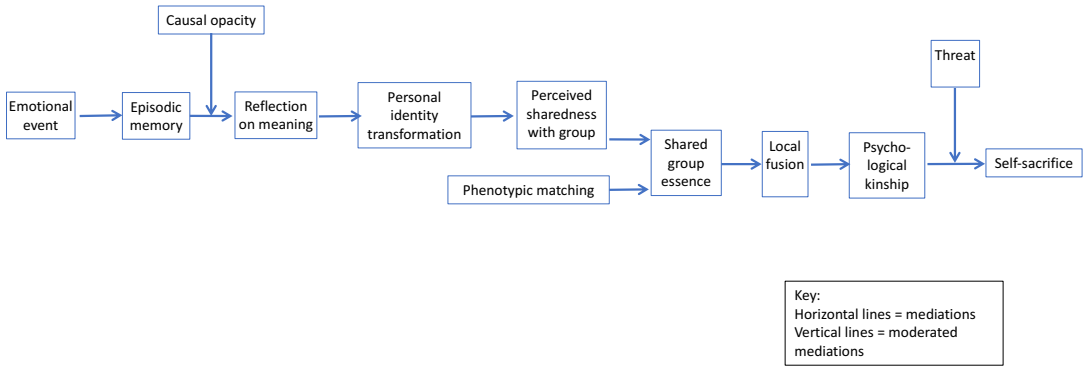

Figure 1: Pathways to local fusion and self-sacrifice

The theory outlined in Figure 1 constitutes the first effort to synthesize findings from a global programme of inter-disciplinary research spanning several decades. Each of the boxes refers to a psychological event or process, forming part of two distinct causal chains. One of these chains begins with the perception of an emotional event that is subsequently stored in episodic memory; to the extent that these memories relate to causally opaque events (e.g. collective rituals), they prompt reflection, producing rich representations that form part of the core narrative self. When such representations are perceived to be shared with a group this produces feelings of shared essence, in turn giving rise to fusion. There is also a second pathway to fusion in which feelings of shared essence result from phenotypic matching – the perception of common biologically inherited characteristics. Stable perceptions of shared essence created by either of these pathways is predicted to give rise to fusion with a locally bounded group or relational network. Fusion produces a strong impression that members of the group are one's kin, eliciting willingness to pay high personal costs to support the group and, in the face of outgroup threat, to fight and die if necessary to

protect members of the group.

The aim in what follows is to build an encompassing theory of extreme self-sacrifice, capable of explaining the willingness of some individuals to fight and die for their groups. Section 2 argues that suicide terrorism may be understood a form of homicidal self-sacrifice. Section 3 considers evidence that willingness to fight and die for a group, even when the odds of dying are extremely high, can be motivated by identity fusion, rooted in perceptions of shared sufferings and/or common ancestry. Section 4 explores potential evolutionary explanations for the patterns described above. Section 5 argues that ritual ordeals (such as the trials of initiation and hazing) may serve as culturally evolved gadgets for generating identity fusion in armed groups, ranging from warrior tribes to modern military units and terrorist cells. Section 6 considers whether large-scale group alignments, based on identification and extended fusion, can motivate self-sacrificial behavior. Finally, Section 7 provides an overall assessment of the theory presented here, emphasizing limitations as well as strengths, and identifying priorities for future research.

2. Suicide Terrorism as Extreme Self-Sacrifice

In his classic discussion of ‘altruistic suicide’, Durkheim detailed many examples of individuals taking their lives for the glorification of the group. Durkheim cited Charlevoix’s colourful observations in Japan as exemplars of the category:

> "Nothing is commoner than to see ships along the seashore filled with these fanatics who throw themselves into the water weighted with stones, or sink their ships and let themselves be gradually submerged while singing their idol's praises. Many of the spectators follow them

> with their eyes, lauding their valor to the skies and asking their blessing before they disappear. The sectarians of Amida have themselves immured in caverns where there is barely space to be seated and where they can breathe only through an air shaft. There they quietly allow themselves to die of hunger. Others climb to the top of very high cliffs, upon which there are sulphur mines from which flames jet from time to time. They continuously call upon their gods, pray to them to accept the sacrifice of their lives and ask that some of these flames rise. As soon as one appears they regard it as a sign of the gods' consent and cast themselves head-foremost to the bottom of the abyss… The memory of these so-called martyrs is held in great reverence." (Charlevoix quoted in Durkheim 1897 [1951]).

In the passage where this quotation occurs, and in many others, Durkheim is at pains to emphasize that altruistic suicide is an expression of 'underindividuation' – the sublimation of the personal self to the greater and nobler will of the group. Durkheim associated underindividuation with what he called 'the lower societies' – that is, small-scale traditional societies where the division of labour was sufficiently simple that persons seemed eminently replaceable, one person substituting more or less easily for any other. Durkheim famously argued that the emotionally arousing rituals of simple societies served to heighten 'collective conscience' to a point of great fervour and excitement, eclipsing or even obliterating any sense of personal agency and individuality. He regarded the military as one of the last refuges of this primitive mentality in otherwise civilized societies and used this to explain the high incidence of altruistic suicide in various armies and navies, as well as self-sacrifice on the battlefield (Durkheim 1897 [1951]: 234-237).

In what follows, however, a somewhat different view is presented. Fusion resulting from the perception of shared essence does not sublimate individual identity but enables group alignments to tap into the motivational power of personal agency,

168 strengthening and emboldening it. Fused individuals see themselves not merely as
169 instruments of the group but as willing to do more for the group than other members.
170 They see their personal self as encompassed, but not eclipsed, by the group. On this
171 view, altruistic suicide is not caused by 'underindividuation' as Durkheim conceived
172 of it, but by a visceral sense of oneness between self and group.
173
174 Suicide terrorism, the act of laying down one's own life in an effort to weaken or
175 destroy an outgroup, may also be regarded as a form of altruistic suicide (Pape 2005:
176 Chapter 9). As such, it forms part of a much larger class of extreme behaviors that
177 involve sacrificing oneself for the group, ranging from non-homicidal forms of
178 suicide (such as taking a bullet for a comrade or setting fire to oneself) through to so-
179 called 'suicide missions' in conventional armies. Although suicide terrorism may be
180 shaped by sophisticated strategic considerations (e.g. careful selection of targets to
181 maximally advance terrorist objectives), altruistic motivation is a necessary condition
182 for implementing these strategies, inasmuch as the individual is required to give up
183 his or her own life for the sake of a group. Such actions may be described as *extreme*
184 because they are (or are most likely to be) fatal. Efforts to explain the phenomenon
185 have often emphasized its seemingly irrational nature, for example attributing such
186 suicides to extreme religious beliefs or to individual pathology (Pape 2005: 16).
187
188 The notion that religious extremism (e.g. via indoctrination) motivates suicide
189 terrorism may seem little more than common sense. Indeed, according to some public
190 intellectuals (e.g. Harris 2004), religious doctrines extolling the righteousness of
191 waging holy wars or of exterminating infidels, self-evidently explain extreme self-
192 sacrifice such as suicide bombing. And it is easy to find examples throughout history

of suicide terrorism being linked to religious beliefs of various kinds, from the Jewish Zealots and the Sicarii of antiquity to the many Islamist terror groups of today. Less convenient for those who favour this line of argument is the fact that most suicide attacks, at least until 2000 (see Atran 2006), have been carried out by secular organizations, and not by religious extremists (Post et al. 2009: 15; Gambetta 2005). Moreover, studies in the lab and in natural settings suggest that religious beliefs lead to prosocial action because they serve as markers of group alignment. That is, it would seem to be attachment to a collective, forged through shared rituals or other identity markers, and not beliefs *per se* that motivate pro-group action (Bloom 2012). For example, in a series of studies (Ginges et al. 2009) frequency of participation in collective rituals has been shown to predict support for suicide attacks whereas frequency of prayer (as a less groupish devotional act) does not. Ginges et al. found that for Palestinian Muslim adults, frequency of mosque attendance predicted stated willingness to die for one's religion as well as support for suicide attacks but, again, frequency of prayer did not.

It is possible that some extreme beliefs become so closely linked to the group that they take on an aura of sacredness (Atran, 2010), but if that is so then what connects those values to acts of self-sacrifice may well be fusion with the group rather than commitment to any kind explicit belief system or ideology *per se* (Whitehouse 2016). Efforts to disambiguate the effects of sacred values and group alignment are hard to interpret given that the measures of sacred values so far used in such studies are related to similar measures of willingness to sacrifice for sacred values (Gomez et al. 2017). The theoretical framework presented here suggests that willingness to fight and die is not motivated by doctrines and ideologies, religious or otherwise, but by a

particularly intense love of the group. For highly fused individuals, the survival of the group constitutes a form of personal immortality in ways that may be more real psychologically than any religious dogma alone could convey.

Nevertheless, those who argue that suicide terrorism is a result of *pathology*, may not regard such behavior as an act of self-sacrifice at all. For example, Lankford (2014) has argued that jihadist martyrs may simply be suicidal individuals (see also Merari 2010) who choose this method of killing themselves because it is socially approved and even glorified by the groups they identify with, while also providing conveniently reliable methods (e.g. fatal explosive devices). On this view, the suicide bomber is not embracing death to achieve some greater goal but is actually engaging in a cowardly and selfish act: "For many suicide terrorists, blowing themselves up may feel like the least risky thing they could do – it could offer the greatest certainty that their overwhelming crisis will no longer plague them. For these individuals, the risky thing may be to face their uncertain future, tackle their problems one day at a time, or swallow their pride and ask for help" (Lankford 2014: 360). Lankford argues also that acts of suicide terrorism and genuine acts of self-sacrifice differ in the manner of their planning. Suicide attacks are generally planned long in advance whereas heroic self-sacrifice, such as leaping on a grenade or shielding a comrade in a hail of bullets, is more typically a split-second reaction to unforeseen events (2014: 360). Moreover, the suicide terrorist plans to die whereas genuine military heroes hope to survive, despite appalling risk to life and limb (2014: 359).

The distinction between laying down one's life for a group and merely risking one's life may not be easy to draw, however. Expressed in terms of probabilities, it has been

243 calculated that the chances of surviving an act for which a Victoria Cross medal has
244 historically been awarded in the British and Commonwealth forces is just one in ten
245 (Gambetta 2005: 272). Salim Jawha, a former colonel in Gaddafi's army who joined
246 the insurgency in Misrata on the first day of the revolution, put it to me like this:
247 "When the revolution began, there was no compulsion to join. We just called our
248 friends and asked them: do you want to die or not? If you want to die, come with us.
249 If not, go home and stay out of harm's way." (Jawha, quoted in Whitehouse 2016). Of
250 course, there was no guarantee that one would die as a result of joining the
251 revolutionary forces. But the chances of dying in action were dauntingly high and
252 those choosing to fight were well aware of this. Nevertheless, thousands made the
253 decision to go ahead anyway. They were not suicidal but they were surely prepared to
254 lay down their lives.
255
256 Lankford's argument that suicide terrorists are suicidal has deservedly triggered much
257 instructive debate but has also prompted criticisms, mainly highlighting limitations of
258 the supporting data (Atran 2003, Beit-Hallahmi 2014, Egan 2014, Funder 2014, Qirko
259 2014, McCauley 2014, Merari 1993, Sela & Shackelford 2014, Tobeña & Vilarroya
260 2014, Weiss and Weiss 2014). Although these debates remain unresolved, according
261 to Post et al. (2009), there is a well-established consensus among researchers that
262 group, social, and organizational factors provide the key to understanding most
263 suicide attacks. Factors frequently implicated in this form of terrorism are collective
264 identity (Post 2005), kin psychology (Gray & Dickens 2014), and outgroup hostility
265 (Ginges et al. 2009). New research into the causes of identity fusion suggests that
266 these seemingly disparate theories of suicide terrorism may in fact be highlighting
267 different aspects of a single process. As with some past approaches to suicide

terrorism, the fusion theory emphasizes group alignment and psychological kinship, but it also focuses on the role of shared essence combined with perceptions of outgroup threat in motivating extreme self-sacrifice. This general theoretical framework is further elaborated and empirically substantiated below.

Studying the role of identity fusion in motivating suicide attackers is fraught with practical difficulties. Successful suicide attackers are by definition already dead and those who are foiled, even if they can be interviewed, may be unable or unwilling to provide accurate information on the psychological processes that drew them to violent extremism in the first place. The studies reported below have largely focused on measuring identity fusion and extreme self-sacrifice among currently serving members of armed groups, ranging from revolutionary insurgents to conventional military forces, especially those who, having witnessed the violent deaths of many of their fellow fighters, nevertheless voluntarily expose themselves to the same high risks. Much recent research also investigates the role of identity fusion among those who strongly endorse the use of violent self-sacrifice to accomplish group goals. Despite the difficulties of conducting research into these topics, there is growing evidence that fusion can motivate extreme pro-group action and that this process could plausibly explain at least some if not most instances of suicide terrorism as well as other forms of violent extremism.

3. Shared Essence, Fusion, and Willingness to Fight and Die for a Group

Fusion – a visceral feeling of oneness with a group (Swann et al. 2009) – entails an identity configuration such that essential features of one's social identity are also

293 considered to be essential features of one's personal self. Essentialized conceptions of
294 the personal self or of a group presume the presence of nonobvious properties that are
295 necessary for the entity to exist in its current form (Medin 1989). This is an all-or-
296 nothing mode of categorization in that the person or group must have this nonobvious
297 property or would no longer be the person or group in question (Diesendruck, &
298 Gelman 1999: 339). But how do people come to attribute essences to persons and
299 groups? One possibility is that the essential personal self derives from inherited
300 biological attributes (Gil-White 2001), another that it is formed through life-defining
301 experiences (Whitehouse 2013; Whitehouse and Lanman 2014). That is, we can
302 imagine ourselves as being products of inherited traits as well as being moulded by
303 unique personal histories (Whitehouse et al. 2017).
304
305 A series of recent studies sought to compare the effects on fusion of shared biology
306 versus shared life experiences. In one study (Whitehouse et al. 2017), 198 participants
307 were assigned to three priming conditions in which they wrote about either a self-
308 shaping experience, a set of traits transmitted genetically, or the changing seasons (as
309 control). They were then asked to imagine meeting somebody who had either shared
310 their transformative life event, had turned out to be a long-lost sibling, or was a
311 complete stranger (control). Those in the shared experience and shared biology
312 conditions reported higher levels of fusion with the imaginary person although
313 interestingly the effects were notably stronger for shared experience. In a further
314 study, actual rather than imaginary shared genes and shared experience were
315 experimentally manipulated (Whitehouse et al. 2017). 260 monozygotic and 246
316 dizygotic twins were asked to describe transformative experiences shared with their
317 twin and measures of fusion with twin were then taken. The results showed that both

318 shared biology (as measured by zygosity) and shared experience predicted fusion
319 levels independently.
320
321 Thus, sharing either biological or autobiographical essence with other group
322 members, or both, produces identity fusion. Highly fused individuals report intense
323 family-like connections to other group members, high levels of personal agency, and
324 feelings of invulnerability in their group. Thus, when the group is felt to be
325 threatened, it feels personal. This may help to explain why so many groups committed
326 to violence describe themselves as victims acting to defend themselves against
327 external aggressors (Furedi 2015). The desire to protect the group is experienced by
328 fused individuals as an urgent and compelling act of self-defence. This process may
329 resemble the way in which mortality salience stimulates ingroup defence and support
330 in the population at large (Fritsche et al. 2008) but more acutely in the case of highly
331 fused individuals, due to amplified feelings of personal agency (Swann et al 2010).
332 Highly fused individuals exhibit an urge to make personal sacrifices for their group,
333 ranging from donations of blood to help victims of terrorist attacks (Buhrmester et al.
334 2014) to fighting on the frontlines at grave personal risk (Whitehouse et al. 2014).
335
336 Efforts to investigate the shared experience pathway to fusion have focused on the
337 role of self-defining episodic memories (Whitehouse 2013). Psychologists have long
338 appreciated that memories for transformative experiences impact the development of
339 personal identity (Conway 1995; Singer & Salovey 1993) and considerable empirical
340 research has been conducted into the mechanisms linking memory for and reflection
341 on life-changing experiences to autobiographical narratives and the construction of
342 the personal self-concept (e.g. Conway 2005; Çili & Stopa 2014). What fusion theory

adds is the insight that some emotionally intense experiences are not only transformative in shaping the personal self but – insofar as these experiences are shared with relevant others – they also define the group (Whitehouse 2004), producing a visceral sense of 'oneness' or shared essence. Consequently, the personal self and the group self are uniquely conjoined in fused individuals – being forged through the same potent experiences that endure in memory (Whitehouse and Lanman 2014).

In order to investigate these processes, recent empirical research has focused on populations that have undergone emotionally distressing experiences together. Events involving psychological or physical suffering appear to have an especially enduring impact on memory and subsequent reflection (Pillemer et al. 1987; Conway 1995; Whitehouse 2006). In the literature on shared experience and identity fusion, such events are typically described as 'dysphoric' (Jong et al. 2015; Whitehouse et al. 2017) but they are often also accompanied by feelings of elation, for example upon surmounting the ordeal (Kavanagh et al. 2017). Indeed, it may be that an emotional 'high' is partly responsible for the long-term memory effects of such experiences. The theory elaborated here is primarily concerned with the impact of shared emotional events on the fusion process (via the mediating effects of memory, reflection, etc. as set out in Figure 1). Some of the research described below suggests that dysphoric events have a bigger effect on fusion than euphoric ones but it is not yet clear whether negative valence or merely overall emotional intensity is the key factor.

A recent cluster of studies, focused on the effects of recalling terrorist attacks in New York, Madrid, and London, has shown that the simple act of remembering such

368 experiences increases reported levels of fusion with and willingness to die for one's
369 country (Buhrmester et al. in prep). Moreover, the extent to which dysphoric
370 experiences are felt to be transformative or 'self-defining' predicts their effects on
371 fusion. Similarly, the more nationalists and unionists in Northern Ireland have
372 reflected on their sufferings during the history of sectarian conflict in that region, the
373 more fused they are with their respective communities (Jong et al. 2015). Further, to
374 demonstrate that such reflection actually causes elevated fusion, Bostonians affected
375 by the 2013 Marathon bombings were primed with memories of the atrocity (versus
376 controls who were invited to recall memories of running errands in Boston) and those
377 who felt more intense negative emotions as a result of the prime were indeed more
378 fused with their fellow Bostonians (Jong et al. 2015).
379
380 Similar patterns have been observed among spectators at football matches where fans
381 who felt they had been most shaped personally by their memories of especially
382 emotional club events also reported higher levels of fusion (Newson et al. 2016). For
383 example, a recent survey of supporters of Premier League football supporters in the
384 UK found that sharing the dysphoric experience of losing soccer matches made fans
385 more willing to sacrifice themselves for each other, an effect that was mediated by
386 identity fusion (Whitehouse et al. 2017). Losing seems to fuse fans more effectively
387 than winning and, consequently, the less successful teams are likely to have the most
388 loyal fan bases. Of course, this also means that the more embattled supporters would
389 show greater eagerness to fight on the terraces but, while such fervent commitment to
390 club does sometimes spill over into violence, intergroup rivalry is more typically
391 expressed in relatively harmless symbolic acts such as chanting and song.
392

Some aspects of the process by which shared dysphoric experiences lead to fusion have now been measured physiologically as well as using psychometric tests and self-report. For example, a recent longitudinal study of Brazilian, Spanish, and English fans during the 2014 FIFA World Cup revealed that increased heartrate and cortisol levels during live matches predicted higher levels of fusion over time (Newson et al. Revised). Efforts have also been made to explore the physiological processes by which outgroup threat motivates self-sacrifice in highly fused individuals. For example, recent studies using brain-scans to monitor activity in the medial prefrontal cortex (mPFC), a brain region associated with group membership processing, have explored the effects of fusion on the brain when deciding to pay a personal cost to harm a rival outgroup. In these studies, football supporters playing economics games with rival fans showed a marked tendency to punish fair and unfair offers alike, at cost to self. Activity across ventral and dorsal portions of mPFC, however, was affected by levels of fusion in these participants; the more highly fused players showed the strongest evidence for fairness by group membership interaction in the relevant brain regions (Apps et al, Revised).

In the above examples, sharing emotionally intense experiences has been shown to give rise to fusion and therefore willingness to fight and die for the group. Nevertheless, most of these studies rely mainly on self-report measures and hypothetical cooperation problems. Although behavioural measures, such as economic games and trolley problems, have been used in some of the studies reported above, these are not ideal proxies for extreme self-sacrifice, our main interest in the present context. To test this theory properly requires investigation of processes of fusion among people who *actually* lay down their lives for each other. The ethical and

418 practical impediments to conducting psychological research with suicide bombers
419 undergoing training are severe, however. And while it may be possible to interview
420 thwarted terrorists serving prison sentences, this approach too is fraught difficulties
421 including the need to build rapport and trust with interviewees as well as to overcome
422 incentives for offenders to provide self-serving or misleading responses.
423
424 Recent efforts to investigate violent extremism operating outside the rule of law have
425 focused on studies with frontline fighters in military groups such as members of
426 revolutionary battalions in Libya during 2011, the year of the Arab Spring. The vast
427 majority of Libyans who took up arms in 2011 were ordinary civilians, many of
428 whom had never even held a gun prior to the uprising. All of them knew their chances
429 of survival were poor. Many thousands were killed or suffered devastating injuries
430 and all of them lost friends and family during the conflict.
431
432 Interviews were conducted with 179 insurgents in the city of Misrata (Whitehouse et
433 al. 2014). Half the sample were frontline fighters and the others providers of logistical
434 support to the fighters. All reported near ceiling levels of fusion with their families,
435 with their closest friends in the battalions, and even with the members of other
436 battalions, but not with pro-revolutionary Libyans who never joined a battalion and
437 therefore did not fully share the intensely dysphoric experiences of participation in the
438 2011 uprising. In view of these high levels of fusion with multiple groups, a forced
439 choice question was introduced: if you had to choose only one group as your primary
440 fusion target, which would it be? And this produced a striking difference between
441 those who faced the most traumatic ordeals of the war and those who suffered but not
442 as intensely, by working behind the scenes. Frontline fighters were nearly twice as

likely (compared with providers of logistical support) to choose fellow revolutionaries over their families.

A limitation of this study, however, is that there was no way of ascertaining whether shared dysphoric experience in battle led to high levels of fusion or fusion drove Libyan insurgents to the front line in the first place. To adjudicate on this question, studies have been undertaken with conventional troops that lacked control over their deployment on the front lines. For example, a survey of 380 Vietnam war veterans in the USA found that intensity of dysphoric combat experience predicted fusion with fellow fighters and that this fusion also mediated willingness to make personal sacrifices for other veterans (Whitehouse et al. 2017). Although there are many practical impediments to conducting research with groups whose members have sacrificed their lives in appreciable numbers, and the evidence drawn upon here is limited, efforts to access more participants in other troubled regions of the world are ongoing. Data collection using much the same methods as those employed in Libya in the research described above has been undertaken among fundamentalist Islamist groups and convicted terrorists in prison (e.g. Kavanagh et al. In prep).

4. The Evolution of Fusion and Extreme Self-Sacrifice

From a gene's eye point of view the vehicle for its transmission (the individual organism) should usually preserve its own life and maximize its reproductive advantage at all costs but kin selection famously presents an exception. Kin selection causes genes to increase in frequency when the degree of genetic relatedness of individuals benefiting from an altruistic act, multiplied by the benefit thereby

468 procured, is greater than the reproductive cost to the altruist. Self-sacrifice to save
469 fellow group members might make evolutionary sense if all members of the ingroup
470 are genetically very similar, as in the case of some eusocial insects. In the case of
471 humans, taking a fatal spear to protect one's kinsmen might be similarly adaptive if,
472 under evolutionarily stable conditions, self-sacrificing individuals stood a better
473 chance of passing on their genes via surviving relatives than by mating successfully
474 themselves.
475
476 Fusion may have arisen as a psychological adaptation to facilitate cooperation among
477 kin in the face of extreme adversity, such as lethal outgroup threat (Whitehouse and
478 Lanman 2014) but it may simply be a byproduct of the way autobiographical memory
479 evolved in humans. Still further evolutionary explanations for fusion are considered
480 below. Nevertheless, even if fusion was a psychological adaptation that arose through
481 kin selection, social institutions could hijack the fusion mechanism in novel ways. For
482 example, male initiations involving extreme privations and sufferings could mimic
483 the trials and tribulations of kin groups struggling to survive in tough environments,
484 producing similar psychological effects and behavioural outcomes. An important
485 difference is that the ordeals of initiation deliberately maximize emotional and
486 sensory impact, so as to create a stable impression of shared essence in an imaginary
487 'brotherhood' (Whitehouse 1996; 2004). In everyday life, by contrast, the shared
488 sufferings and setbacks of kin groups occur more unpredictably, and their emotional
489 intensity, causal opacity, and consequentiality for group members is more variable,
490 taking many years to assemble and thus to produce fusion and psychological kinship
491 (Whitehouse 2013). In short, some social institutions may have arisen through

492 cultural evolution that exploit our biologically evolved systems for supporting and
493 defending kin in the face of adversity.
494
495 It is also conceivable that culturally evolved discursive practices exploit intuitions of
496 shared biology to some extent, for example by referring to priests as 'fathers' or
497 group territory as the 'motherland'. In a recent survey covering 11 countries from six
498 continents, 86.1% of the 2,438 respondents expressed willingness to die for their
499 families before any other group (Swann et al. 2014) but the same survey also showed
500 that priming feelings of shared biology among people already fused with their
501 countries made them more willing to make extreme sacrifices for their fellow
502 countrymen. Mediation analyses showed also that fusion impacted willingness to fight
503 and die for country via feelings of kinship. These findings are supported by studies of
504 groups actually (as opposed to hypothetically) experiencing an external threat. For
505 example, in the wake of the 2013 Boston Marathon bombings, the willingness of
506 locals fused with America to give blood or money to help the victims was mediated
507 by feelings of psychological kinship with fellow countrymen, expressed by endorsing
508 statements like "members of my country are like family to me" (Buhrmester et al.
509 2014).
510
511 The kin selection account for the evolution of fusion suggests that shared life-shaping
512 experiences, just like biologically inherited traits, may have served as reliable
513 phenotypic markers in ancestral groups composed mainly of closely related
514 individuals (Lieberman et al. 2007; Whitehouse & Lanman 2014) and this seems
515 consistent also with the finding that sharing core values or attitudes signal genetic
516 relatedness (Park & Schaller 2005; Swann et al. 2014). A common cause of shared

life-shaping experiences, prompting fusion and extreme self-sacrifice, may have been chronic intergroup raiding and warfare. There is some debate about the prevalence of warfare in the Pleistocene but some scholars estimate that up to 40% of all male deaths in human prehistory can be attributed to intergroup conflict (Keeley 1996). Even if this seriously exaggerates war-related mortality rates (Ferguson 2013), there is little doubt that intra-species violence is a widespread and persistent feature of human behaviour (Gómez et al. 2016) and ancient foragers probably always faced threats of predation that were best parried by standing together, despite strong temptations to defect or run away.

Previous research has likewise emphasized family-like bonds as a powerful motivator of suicide terrorism (Atran 2003; Mandel & Litt 2013) and of self-sacrifice for comrades in conventional military groups (e.g. Stouffer et al. 1949; Vaughan & Schum 2001). Gray and Dickens (2014) link this urge to protect one's 'brothers-in-arms' to perceptions of shared biology based on phenotypic matching. In an interesting application of kin selection theory to the phenomenon of suicide in general, it has been suggested that individuals with little chance of reproducing may constitute a drain on the resources of their kinsmen, such that committing suicide might actually increase their inclusive fitness by improving their chances of passing on genes via their surviving relatives (deCatanzaro 1980; but see also Syme et al. 2015). One might object that the act of suicide could itself cause serious collateral damage impairing the prospects of bereaved kinsmen, not least due to social stigma. And Joiner (2015) has argued that suicide in general results from a pathological underestimation of one's own evolutionary worth and overestimation of the burden one is inflicting on others. But Joiner's argument could be turned on its head in the

542 case of suicide bombers, in that martyrdom may indeed serve to improve the
543 circumstances of their families. For example, Blackwell (2008) has argued that
544 Palestinian suicide attackers increased their inclusive fitness outcomes by
545 contributing, through the celebrity of their deaths, to the wellbeing and reproductive
546 prospects of their close kin.
547
548 Following a closely argued discussion of these issues, Orbell and Moriwaka (2011)
549 consider whether Blackwell's argument can shed light on the motivations of
550 kamikaze pilots in WW2. Based, however, on extensive analysis of letters, poems,
551 wills, and memoirs left behind by 661 Japanese pilots who perished in suicide attacks,
552 the authors conclude that the act of self-sacrifice was not undertaken in order to
553 increase the welfare of close kin. Rather, the writings of kamikaze pilots placed much
554 greater emphasis on the desire to die for the nation or for the emperor. One
555 possibility, considered by Orbell and Moriwaka, is that an evolved algorithm to
556 sacrifice self for kin had somehow been hijacked by nationalistic ideology, such that
557 the country or its ruler had taken on the status of family. Nevertheless, as these
558 authors also observe, evolution should act strongly against mistaking fellow
559 countrymen for kin, especially where the stakes are so high. Rather, they suggest that
560 when warfare becomes genocidal, a distinct psychological mechanism comes into
561 play that enables kin groups to form coalitions:
562
563 "To be successful (thus to survive in the event of genocide), coalitions of kinship groups
564 would have to include significant numbers of individuals who were prepared to fight and
565 perhaps die for individuals who were *not* close kin—whatever primary loyalties might be
566 owed *to* close kin. A coalition of kinship groups whose members fought only for their own
567 group would be a notably ineffective coalition, likely to be defeated by a coalition of kinship

> groups *whose members mobilized kinship-based emotions on behalf of the entire coalition, kin and nonkin*… In the context of coalitional warfare, therefore, natural selection could favor genes that led an individual to respond to all members of a coalition as if they were close kin—and not just to those members of the coalition who were *in fact* close kin." (Orbell & Moriwaka 2011: 20-12).

Intriguing as this argument undoubtedly is, it is by no means clear that genocidal outgroup threat, as envisaged by Orbell and Moriwaka, was sufficiently acute and widespread in human prehistory for such a mechanism to evolve under natural selection. At any rate, it would be wise to consider a range of alternatives to kin selection to explain how extreme self-sacrifice may have evolved under natural selection.

One recent study presents a mathematical model predicting that any group suffering negative experiences, not only kin groups or coalitions of kin groups, should be more cooperative in the future (Whitehouse et al. 2017). The model, based on a multi-level selection approach, considered an imaginary population divided into numerous groups whose survival depended on overcoming two kinds of collective problems: 'us vs. nature' contests (e.g. hunting game, defending against predators) and 'us vs. them' contests (e.g. conflict with other groups over access to resources). In the real world, failure of any given group in an 'us vs. nature' contest might have little impact beyond the group itself; by contrast, doing well or badly in 'us vs. them' contests would likely have a significant impact on surrounding groups participating in conflict. In the model, 'doing well' equated to a euphoric experience with a corresponding positive impact on the fitness of group members, as measured by their capacity to leave offspring. By contrast, 'doing badly' equated to dysphoric experience and had

the opposite effect. Groups that did so badly they died out were replaced by the offspring of more successful groups.

The setup consisted of two rounds. In the first round, euphoric (fitness increasing) or dysphoric (fitness reducing) experiences were randomly assigned. If that was all there were to it, then groups undergoing euphoric, fitness-enhancing experiences would obviously do better than those that had dysphoric experiences. But the model also contained a second round in which the consequences of each group's efforts overall to solve collective action problems were measured. Every individual was allocated a pair of genes, one of which was capable of triggering cooperative behaviour only after a euphoric experience and one of which was capable of doing so only after a dysphoric experience. But only one of these genes could be expressed in any given individual and all individuals of the same group shared this capacity. Thus, the model was designed to study the evolution of genetic endowments controlling behaviour. Although these genetic endowments made cooperation possible, they certainly didn't make it inevitable. In fact, the model was set up so as to make the chances of cooperation close to zero. However, we ran not one but many simulations allowing for mutation, recombination and migration. Each group lineage went through both euphoric and dysphoric experiences at equal frequencies. The question was whether cooperative behaviour would evolve over repeated simulations. The finding was that the gene effects on cooperation resulting from dysphoric experiences evolved to be larger than gene effects on cooperation resulting from euphoric experience. This pattern was even more pronounced for groups engaged in 'us vs. them' contests than for those engaged in 'us vs. nature' contests, the former involving more intense intergroup competition.

5. Ritual and Local Fusion

Throughout most of prehistory, our ancestors lived in hunter-gatherer bands confronted with both 'us versus nature' and 'us versus them' contests. If the fusion mechanism originally evolved in small, relational groups of this kind then it should come as no surprise that terrorists are also usually tied to highly cohesive cells comprising around ten core individuals on average (Richardson 2006). We refer to this as *local fusion* (Swann et al. 2012; Whitehouse 2013), as distinct from 'extended fusion' discussed in the next section. While fusion in ancestral foraging bands may have come about through exogenously caused dysphoric events, such as enemy ambush or natural disaster, some prehistoric groups probably also engaged in rare, emotionally intense rituals serving as cultural gadgets to increase levels of fusion among warriors and hunters.

Many scholars have observed that collective rituals are a potent source of cohesion in social groups and that the more physically or psychologically arduous the rituals in question the more powerfully they bond participants (Durkheim 1912; Irons 2001; Henrich 2009; Konvalinka et al. 2011; Olivola & Shafir 2013; Xygalatas et al. 2013). Early examples come from evidence for initiation rituals in Upper Paleolithic deep cave sites involving altered states of consciousness and manipulation of the visual and auditory affordances of underground labyrinths (Rossano 2010). In the early stages of the Neolithic too, rare and emotionally intense rituals probably occurred, for example in the form of hunting-ancestor cults at sites like Cataloyuk where pictorial art suggests the sporadic performance of dramatic feasting events involving the baiting of

644 large and dangerous animals (Whitehouse & Hodder 2010; Whitehouse et al. 2014).
645 Emotionally intense rituals, fusing participants into small relational groups, may also
646 have been necessary for ancient foragers coping with natural hazards (Rossano 2010:
647 91). The association between rare, emotionally intense ritual ordeals, on the one hand,
648 and social cohesion and self-sacrifice for the group is even more readily apparent in
649 the much richer datasets relating to contemporary small-scale societies. For example,
650 based on an analysis of ethnographic data stored in the standard cross-cultural sample,
651 it has been argued that the severity of traumatic initiation rites is positively correlated
652 with warfare intensity (Sosis et al. 2007).
653
654 The pain and fear evinced by some collective rituals documented by anthropologists
655 are so extreme that they have been described as 'rites of terror' (Whitehouse 1996).
656 Procedures entailed in such rituals bear comparison with techniques of torture,
657 entailing beatings, whippings, mutilation, burning, and evulsion of the fingernails
658 (Barth 1987; Strehlow 1947). Pain is often inflicted on especially sensitive regions of
659 the body, such as the genitals (Barth 1975). In addition to direct assault, such rituals
660 commonly inflict suffering by depriving participants of rest, sleep, food, warmth,
661 light, social contact, and other basic needs, often for extended periods (Allen 1967).
662 One of the effects of agonizing ritual ordeals is that they bond participants together so
663 tightly that they will stop at nothing to defend each other and their fellow tribesman
664 from external threats. Often these extreme rituals are associated with warrior cults and
665 may be accompanied by oaths to defend the group and commitments of unwavering
666 loyalty (Weisfeld 1979).
667

668 Rites of terror have been documented all around the world and evidence of their
669 existence is present throughout human history and prehistory, and so the need for a
670 general explanation has long been recognized. Inspired by Festinger's (1957) theory
671 of cognitive dissonance, Aronson and Mills (1959) proposed that the endurance of
672 painful initiations into the group is inconsistent with disliking the group and
673 consequently initiates convince themselves that the group is worthy of their loyalty
674 and affection. Others have suggested that participation in painful rituals serves as a
675 costly signal of commitment to the group, thereby promoting trust and prosociality
676 among group members (e.g. Bulbulia 2004; Sosis 2003). A drawback with both
677 dissonance and costly signalling explanations of rites of terror, however, is they
678 assume that participation is voluntary. Although that may be true in some cases, very
679 often it is not. Failure to submit to the ritual tortures typically carries heavy penalties
680 – ranging from social exclusion to execution (Cimino 2011). Moreover, these theories
681 often assume that the ritual ordeals are used to mark entry into groups and often this is
682 not the case; they may be performed by already-established groups for a wide range
683 of stated purposes that have little or nothing to do with initiation or the conferment of
684 membership (Whitehouse 1996; Atkinson & Whitehouse 2011).
685
686 An alternative perspective is provided by the theory of 'imagistic practices'
687 (Whitehouse 2000) that is consistent with the 'shared experience' pathway to fusion
688 discussed above (and which it largely inspired). Unlike cognitive dissonance and
689 costly signalling approaches, the theory of imagistic practices applies to a wider range
690 of intensely emotional rituals and not only voluntary initiations (Whitehouse 2004).
691 An early account of imagistic bonding focused on a single case study: a cargo cult in
692 the rainforest of New Britain, Papua New Guinea known as the Pomio Kivung

693 (Whitehouse 1995). Observations and interviews in the field suggested that
694 emotionally intense rituals, particularly those involving negative valence (such as
695 pain, fear, and disgust), produced vivid and enduring memories (Whitehouse 1992).
696 In view of the causally opaque, seemingly arbitrary nature of ritualized behaviour,
697 episodic memories for cult rituals prompted efforts to interpret the meaning and
698 significance of what had occurred, a process that has been dubbed 'spontaneous
699 exegetical reflection' (Whitehouse 2001; 2004). The sharing of traumatic ordeals and
700 subsequent process of reflection on their significance and value seemed to contribute
701 to group bonding among splinter-group members (Whitehouse 1995).
702
703 Based on all the real-world research conducted so far, both quantitative and
704 qualitative, it appears that imagistic rituals produce social cohesion through the
705 sharing of exceptionally thought-provoking and life-shaping experiences, encoded in
706 episodic memory (Whitehouse 1992; 1995). Because these kinds of memories specify
707 who else was present at the time, the groups they generate have rigid boundaries –
708 members cannot be added if they are not part of the recalled episode nor can anyone
709 who participated be excised from memory. As such, imagistic practices are associated
710 with relatively fixed, small, face-to-face groups an observation based on both
711 ethnographic data (e.g. Whitehouse & Laidlaw 2004) and historical materials (e.g.
712 Whitehouse & Martin 2005; Whitehouse & Hodder 2010). Fine-grained qualitative
713 case studies have provided useful insights into the nexus of relations between ritual,
714 emotion, memory, reflection, group cohesion, and prosocial commitment, including
715 willingness to fight and die for the group in conditions of intergroup conflict and
716 warfare (Whitehouse and McQuinn 2012). This qualitative information has been
717 gradually augmented by quantitative correlational studies of large datasets (Atkinson

718 and Whitehouse, 2011; Whitehouse et al. 2013; Gantley, Whitehouse, & Bogaard, In
719 Press). Research on these topics has also led to the creation of by far the most
720 ambitious longitudinal dataset on ritual and social complexity ever constructed known
721 as *Seshat: Global Historical Databank.* This vast storehouse of historical data is now
722 making it possible to explore the relationship between shared emotion, ritual
723 frequency, group size and structure, warfare, and agricultural intensity over thousands
724 of years and on a global scale (Turchin et al. 2012; Currie et al. 2015; Turchin et al.
725 2015; Whitehouse et al. 2015).
726
727 Central to the theory of imagistic practices is the idea that rare or unique emotionally
728 intense experiences give rise to vivid, long-lasting memories for episodic details (such
729 as what happened, how it felt, who else was present, etc.). These memories in turn
730 become a locus for subsequent reflection, infusing the episodes recalled with meaning
731 and salience (Barth 1975, 1987; Whitehouse 1992, 2003). If experiences of suffering
732 and trauma are especially memorable and thought-provoking, this should be all the
733 more so in the case of strongly valenced rituals which, like all rituals, are by
734 definition 'causally opaque' – that is, actions for which nobody would expect there to
735 be a rational physical-causal explanation (Whitehouse 2011). Ritual procedures are
736 the way they are because that is the done or conventional way of performing them and
737 this in turn makes them interpretable in a wide range of different ways (Humphrey &
738 Laidlaw 1993; Whitehouse 2004). Emotionally charged rituals, since they are both
739 causally opaque and remembered long afterwards, prompt a protracted search for
740 meaning, a feature frequently observed in mystery cults and other esoteric religious
741 traditions (Chinnery & Haddon 1917; Williams 1928; Whitehouse 1992, 2001, 2002;
742 Martin & Pachis 2009). Undergoing especially salient, symbolically charged rituals,

743 as well as the process of revelatory meaning-making ensuing from them, is at once a
744 very personal experience but also one that is shared with the group. For participants,
745 these rituals are not only self-shaping they are also group-defining. In part, this is
746 because the memories for such experiences are unique and unrepeatable, specifying
747 who else was present. Groups formed in this way have somewhat rigid boundaries –
748 those who were not present cannot be inserted into one's memories after the fact, nor
749 can anybody who has been through the ordeals be excluded subsequently
750 (Whitehouse 2004).
751
752 Early efforts to investigate these processes in carefully controlled experiments, used
753 artificial rituals with sufficient emotional intensity to prompt both episodic recall and
754 subsequent reflection on their meaning. In one such study, participants were invited
755 to participate in what they were told was a reconstruction of an ancient Amazonian
756 fertility rite (Richert, Whitehouse & Stewart 2005). According to the cover story,
757 anthropologists were seeking to puzzle together the long-forgotten meanings of the
758 ritual acts and artefacts and were eager to learn from the impressions and
759 interpretations of participants in the reconstruction. As part of the ritual sequence
760 participants were invited to place their hands in a hole in the ground while a drum
761 played in the background. In this between-subjects design, the actions were varied
762 such that participants in a high-arousal condition wore blindfolds when reaching into
763 the hole. This made the experience considerably more frightening, as evidenced by
764 self-reports of emotional intensity gathered immediately afterwards. All participants
765 were asked to describe their ideas about the meaning of the ritual a week later,
766 allowing time for reflection in the intervening period. Those experiencing the ritual as
767 more frightening scored significantly higher on the meaning-making measures,

768 suggesting that dysphoric intensity is linked to spontaneous reflection on the
769 symbolism of ritual actions. These findings have been further supported by
770 experiments using more objective measures of physiological arousal (Richert,
771 Whitehouse, & Stewart 2005), and other methods of inducing dysphoria such as the
772 trauma film paradigm (Russell, Gobet, & Whitehouse 2014). In addition to
773 experiments using made-up rituals, studies of real world rituals suggest that the more
774 frightening or painful the ritual experience the more exegetical reflection it provokes
775 (e.g. Xygalatas 2007). Moreover, recent studies of hazing rituals have shown that
776 elevated exegetical reflection on the meanings of collective rituals mediates the
777 relationship between dysphoric intensity, identity fusion, and willingness to sacrifice
778 oneself for the group (Whitehouse et al. 2017).
779
780 Although modern day hazing rituals are usually illegal and therefore difficult to study
781 directly, especially in high-security environments such as the military, it is possible to
782 conduct research on the phenomenon in certain contact sports such as Brazilian Jiu-
783 Jitsu. BJJ is a martial art based on principles derived from Judo. BJJ practitioners
784 must progress through a system of grades associated with distinctive belts. In some
785 BJJ schools, promotion to a higher grade entails a form of hazing via agonizing belt
786 whippings, producing severe welts and bruises to the back and shoulders. A recent
787 study of 564 BJJ practitioners showed that those who had suffered the most intense
788 whippings reported higher levels of fusion to their school and also expressed greater
789 stated willingness to risk their lives fighting for the club (Kavanagh 2017;
790 Whitehouse et al. 2017). In a related study, 146 members of American college
791 fraternities and sororities were asked about their experience of hazing or other
792 initiatory ordeals. The more central such ritual experiences were to the participants'

793 personal identities the higher their reported levels of identity fusion with their
794 fraternity or sorority, and the more willing they were to sacrifice themselves for the
795 sake of the group (Whitehouse et al. 2017).
796
797 In view of the above, it should come as no surprise that a recent exhaustive survey of
798 modern suicide terrorism identified bonding via intense initiation rituals one of the
799 features common to most suicide groups (Pape 2005: 8). But while imagistic practices
800 in the small-scale societies of prehistory would have supported efforts to fend off
801 other groups of similar size, wielding more or less equivalent levels of lethal force,
802 such practices took on a whole new significance with the emergence and spread of
803 states and empires. Jewish Zealots who set out to assassinate Herod during the Roman
804 occupation of Judea, or the Ismaili Assassins undertaking suicide missions in eleventh
805 and twelfth century Persia, Syria, and Lebanon, willingly gave their lives for the sake
806 of a group but they did so in a highly asymmetric theatre of operations, where the
807 outgroup was more or less certain to overpower them as individual actors (Gambetta
808 2005). Through their martyrdom they intended to instil fear in the powerholders and
809 motivate others to rise up in support of their cause. The same logic, albeit without the
810 element of murderous intent, motivated the hunger strikes of Mahatma Gandhi in
811 1940s India and the self-immolations of Buddhist monks and nuns in 1960s South
812 Vietnam, both of which resulted in massive movements of popular support. In the
813 same way, suicide terrorists of recent decades have harnessed the motivating power of
814 fusion, whether generated through naturally occurring shared experiences of
815 oppression or artificially induced ritual ordeals (or more likely both), to mobilize
816 would-be martyrs to strategic effect (Pape 2005).
817

Not only in the specific case of terrorist cells but in other kinds of interest groups, embedded in religions, professional guilds, and even schools and universities, imagistic practices have posed a threat to centralized states, empires, and priesthoods and have historically played a prominent role in many civil wars and revolutions as well as religious splinterings and reformations (Whitehouse 2004; Whitehouse and Martin 2004). Efforts throughout history to suppress, contain, or wipe out imagistic organizations have met with varying success (Whitehouse and Martin 2005). And the same may be said of America's global 'war on terror', which in many cases amounts to an effort to eliminate unauthorized imagistic cells, especially those with a revolutionary vision to establish alternative states or empires. But ruling elites have also opportunistically harnessed the imagistic mode, by endorsing rituals that foster local fusion among elite groups and crucially also in the military. And this continues today, for example in the form of secretive hazing practices in the institutions through which ruling classes are recruited, in the fraternities of elite universities and masonic lodges, and in the armed forces. These practices give rise to fusion in much the same way as imagistic rituals have done for many millennia in small-scale societies and, nowadays, in a wide range of non-state armed groups (Whitehouse and McQuinn 2012).

6. Extended Fusion, Identification, and Self-sacrifice

So far, we have been focusing on fusion within a local group. The members of such groups fuse as a result of undergoing transformative, self-defining experiences together or sharing biological traits that are through interpersonal contact. As such, the bonds of fusion are based on relational ties among particular individuals: family

843 members, fellow fighters in a military unit, co-participants in a ritual, and so on. But
844 there is also evidence that people can fuse with much larger group categories, such as
845 country, ethnic group or world religion. This has been described as 'extended fusion'
846 (Swann et al. 2012; Whitehouse 2013).
847
848 The notion of extended fusion raises a number of conceptual challenges. One of these
849 is the thorny question how it relates to the more extensively studied phenomenon of
850 'identification', which is essentially a measure of the strength of one's commitment to
851 a social category (Tajfel & Turner 1979). Another is how extended fusion might fit
852 with the theory of 'tribal social instincts' (Richerson & Henrich 2012), which
853 includes an evolutionarily grounded account of how ethnic markers arise and spread
854 (Boyd and Richerson 1987). Identification is a depersonalizing form of group
855 alignment in which group members perceive themselves to be interchangeable
856 (Swann et al. 2009) because they are merely the bearers of prototypical traits that
857 have been socially acquired from others (Whitehouse and Lanman 2014). By contrast,
858 fused individuals regard their group identities as grounded in personal experience
859 (Whitehouse 2013) producing a "strong autonomous self" that is "merged with the
860 group" and therefore capable of motivating extreme pro-group action in
861 nonprototypical ways (Swann et al. 2009; Whitehouse, McQuinn et al. 2014; Swann
862 et al. 2014). In contrast, identification with a group only motivates self-sacrificial
863 behaviour to the extent that it is endorsed by the group *and* that one's personal self
864 does not become salient and trigger self-preservation motives that conflict with group
865 values or interests (Whitehouse 2013). The first empirical demonstration of the
866 fundamental differences between identification and fusion was a study in which
867 participants were first asked about their willingness to defend themselves personally

when threatened (priming personal identity) and then their willingness defend their group when threatened (priming group identity). Compared to a control condition that did not prime personal identity, the personal identity prime increased willingness to defend the group at cost to self in strongly fused individuals. But the personal identity prime had no effect on willingness to defend the group among those who were highly identified but not highly fused with the group (Swann et al. 2009). Subsequent studies further support the view that identification and fusion are fundamentally distinct forms of group alignment (e.g. Gomez et al. 2011; Swann et al. 2012).

Nevertheless, *extended fusion*, like identification, entails alignment with group categories rather than with a network of local, relational ties. Some of these group categories specify enormous populations – far too large for their members to know each other personally. Such groups may be described as 'imagined communities' (Andersen 1983), in the sense that one cannot actually perceive one's fellow members directly; instead one can only imagine the coexistence of others in the group who share the same identity markers. It has been argued that semantic memory for shared beliefs and procedural memory for shared practices both play a crucial role in the formation of imagined communities (Whitehouse 2004). Such memories take the form of schemas and scripts in which the slots for actions, actors, patients, and instruments, are not populated by particular individuals and artefacts but generic representations of prototypical ones (Whitehouse 2005). Semantic memory provides us with most of the knowledge required to be a competent member of a large social group, such as a nation or a world religion, but it is a very impersonal kind of knowledge, in which the relevant agents are faceless bearers of social roles. Such memories are not anchored in personal experience – in fact they are acquired through

893 social learning from others in ways that are rapidly detached from any single episode
894 in time or space (Whitehouse and Lanman 2014).
895
896 Unlike fusion, which taps directly into personal experience, identification is
897 'deindividuating' (Diener et al. 1980). Activation of social identities makes personal
898 experience (and thus the personal self) less salient – it is as if one 'loses oneself in the
899 crowd'. Since identification does not tap into personal agency in the same way as
900 fusion, we should expect identification to be a comparatively weaker basis for group
901 cohesion (Whitehouse 2013; Whitehouse and Lanman 2014). True, identification
902 motivates many forms of cooperation in society, including submission to higher
903 authority, following and enforcing norms, participating in democratic institutions,
904 dutifully paying tax or tribute, and so on. It may even lead to heartfelt sympathy for
905 those who lay down their lives for the group. But sympathy for the sacrifices of other
906 group members, including the actions of suicide bombers, is not the same as being
907 willing to undertake such actions oneself. Since identification is not a sufficiently
908 powerful social glue to overcome selfish drives and impulses penal systems are often
909 required to sanction selfishness. This is particularly noticeable where conflicts of
910 interest between individual and group are most extreme and the temptations to defect
911 are high. A case in point would be participation in the military during wartime. But
912 while shooting deserters, or punishing criminality in general, may have a deterrent
913 effect, it is not the most effective way of inspiring commitment to the group. Military
914 leaders have long appreciated that combatants motivated by fear of punishment are far
915 less effective in battle than those motivated by love of the group, of the kind that only
916 fusion can produce. This may be one reason why terrorist and guerrilla forces, even
917 when greatly outnumbered, can present such a stubbornly persistent threat to states

with only conventional armies at their disposal.

Although identification with large group categories may be a relatively weak motivator, at least when it conflicts with personal self-interest, it is reasonable to ask whether extended fusion fares any better. Extended fusion is thought to entail the extension of bonds of kinship to larger groups (Whitehouse 2013), such that the metaphor of brotherhood triggers similar emotional responses, via norm internalization, as genetic relatedness (Richerson and Henrich 2012: 62-3). This might be conceptualized as a process of 'projection' (Swann et al. 2012) whereby bonds forged in small groups, such as the family, come to permeate our feelings about larger groups, such as church or nation. Consistent with this view is the pervasive use of metaphors of kinship when talking about country (e.g. as motherland, fatherland), fellowship (e.g. as brotherhood), and ethnicity (e.g. emphasizing common genealogical roots). Nevertheless, the bonds forged in small relational groups, such as families, are often rooted in quite different kinds of memories from those uniting larger social categories. This is very apparent in the way different kinds of rituals bond participants.

As we have seen, imagistic rituals rely heavily on shared *episodic* memories deriving from rare, emotionally intense, and personally consequential events such as initiation or frontline combat (see above). Relying as it does on self-defining episodic memory, fusion taps into the agentic personal self at the same moment as it activates social identities (Swann et al. 2012). To the extent that these kinds of episodic memories may be associated with much larger group categories, we can fuse with 'imagined communities'. But note that this process of fusion, if correctly conceptualized, must

943 be grounded in concrete personal experience and, consequently, it must be 'local'
944 before it can be 'extended'.
945
946 While fusion with country has been shown to correlate highly with stated willingness
947 to fight and die to protect one's fellow countrymen (Swann et al. 2010), it remains
948 doubtful whether anyone would prefer to die for an extended fusion target over a local
949 one. The fact that the beliefs and practices defining large groups are acquired from
950 others, rather than arising from internal processes of reflection and individual
951 learning, may be one reason why identification fails to tap into personal agency, as
952 noted above. Consequently, even if collective beliefs and practices can be
953 'personalized' via the projection of local fusion onto an extended group, such a
954 process may dilute the authenticity and uniqueness of the episodic memories upon
955 which the fusion of personal and group identities depends. For example, the Christian
956 evangelist might have experienced uniquely episodic and personal revelations even
957 though her conversion narrative is at the same time heavily shaped by socially learned
958 and often quite highly standardized cultural schemas. To the extent that the
959 experience of being 'born again', for example, can be shared with others in one's
960 group, it might really be just the socially learned semantic schemas that are common
961 to conversion rather than the self-defining experiences of converts.
962
963 There is also the question of whether sharing life-shaping experiences first hand
964 produces stronger fusion and associated behavioral consequences than would be the
965 case if the evidence for sharedness is indirect. Tribal initiates or frontline fighters, for
966 example, can actually recall who else was there during the most salient rituals or
967 battles, suffering by one's side. It is possible that this kind of memory fosters the

968 strongest fusion and motivates the most extreme prosocial actions in defending other
969 members of the group. At the other end of the spectrum might be bonds based only on
970 indirect evidence of shared experience, such as wearing the same medals or other
971 insignia. Viewed in this light, war wounds or scars of initiation might serve as
972 evidence of intermediate reliability, a compelling testimony to common suffering but
973 without the episodic 'time travel' quality of remembering particular group members
974 actually being present during shared ordeals. In the study of Libyan revolutionaries
975 reported above, participants expressed ceiling levels of fusion both with members of
976 their own battalions (local fusion) and with those they hadn't met from other
977 battalions who fought bravely (extended fusion) – but on a forced choice question
978 they overwhelmingly chose their relational network over any extended group
979 (Whitehouse et al. 2014). Although it is not yet known whether differences in the
980 strength of local and extended fusion are due to the directness of evidence for shared
981 experience or some other factor, it is quite possible that only local fusion is capable of
982 motivating extreme self-sacrifice. All these topics should be explored more
983 systematically in future research.
984
985 **6. Conclusions and next steps**
986
987 Why die for a group? This paper integrates core insights from the literature on suicide
988 terrorism into a novel theory in which identity fusion, combined with perceptions of
989 outgroup threat, motivates extreme self-sacrifice. It is argued here that fusion is
990 caused by perceptions of shared essence, whether that is due to shared biology, shared
991 experience, or both (although there may be additional, as yet unknown, factors that
992 give rise to fusion). This theoretical framework results from a synthesis of several

993 decades of research on religious groups together with a wide range of more recent
994 studies measuring willingness to fight and die for the group in special populations
995 including football fans, martial arts clubs, Islamic fundamentalists, and members of
996 other highly cohesive organizations, as well as data from groups whose members
997 actually laid down their lives for each other on the battlefield, including non-state
998 armed groups in Libya and conventional forces serving Iraq and Afghanistan.
999
1000 Several theories of the evolutionary origins of the fusion mechanism are considered
1001 here. One proposes that fusion is the outcome of kin selection, motivating high levels
1002 of cooperation and mutual support among close genetic relatives (Whitehouse and
1003 Lanman 2014). Another proposes that conditioning cooperation on past experience is
1004 sufficient to fuse groups of distantly related individuals in the face of adversity
1005 (Whitehouse et al. 2017). These theories are not mutually exclusive and could both
1006 help to explain the biological evolution of the fusion mechanism under natural
1007 selection. In much of human prehistory, fused groups probably comprised small
1008 warring bands bound together in adversity but in contemporary complex societies
1009 fused groups are often embedded in much larger organizations, such as armies,
1010 religious sects, and terrorist organizations. In many cases, fusion results not only from
1011 ordeals triggered by external factors, such as enemy attacks or natural disasters, but
1012 also through culturally evolved cohesion gadgets such as traumatic initiations. So-
1013 called 'imagistic practices' of this kind are found not only in small-scale societies
1014 traditionally at war but also in modern military units and terrorist cells, including
1015 those using suicide attacks as a strategic weapon.
1016
1017 The theory of extreme self-sacrifice proposed in this paper is falsifiable, hinging as it

1018 does on the following testable hypotheses regarding the psychological causes and
1019 behavioural consequences of identity fusion (see Figure 1): perceptions of shared
1020 essence lead to local fusion; perceptions of shared essence are outcomes of at least
1021 two distinct processes (experiencing emotionally intense events with others and/or
1022 believing that one shares inherited biological traits); local fusion motivates
1023 psychological kinship and self-sacrifice for the group. A number of similarly testable
1024 subsidiary hypotheses have also been presented regarding the causal pathways linking
1025 shared emotional events to fusion and self-sacrifice. For example, it is proposed that
1026 episodic memories for shared events are 'group-defining' to the extent that they also
1027 prompt reflection on the meanings of those experienced events. Causally opaque
1028 events are hypothesized to generate more reflection than causally transparent ones. It
1029 is also proposed that fusion and psychological kinship only motivate violent self-
1030 sacrifice when a plausible outgroup threat of sufficient magnitude is present.
1031 Evidence has been presented in support of each of these hypotheses but there remains
1032 a need for wider independent replications to validate existing findings.
1033
1034 The pathways to fusion and self-sacrifice proposed here could turn out to be mistaken
1035 in some of their details, without being completely wrong. What would be fatal for the
1036 theory is if it turned out that convictions of shared essence failed to predict high
1037 fusion scores or if fusion (plus outgroup threat) were shown to be a poor predictor of
1038 actual (as opposed to declared) willingness to fight and die for the group. These two
1039 claims are so central to the conceptual framework that, if shown to be false, the entire
1040 edifice would collapse. Somewhat less disastrous for the theory, but still a setback,
1041 would be a significant reduction in its explanatory provenance. For example, the
1042 theory may eventually prove to be applicable only to some armed groups but not all –

and perhaps most crucially not to suicide terrorists. Although there would seem to be many similarities between the self-sacrificial acts of armed militia (whose fusion levels with numerous target groups have been measured) and those of suicide bombers (whose fusion levels are unknown), these similarities may turn out to be more apparent than real. If, as some have argued (see section 2 above), most suicide terrorists are motivated by pathology (e.g. suicidal depression) rather than the desire to act in the interests of a group, that would be a serious problem for the theory as articulated in this paper. Decisive evidence on this question may require more extensive research among would-be suicide terrorists and those who have attempted unsuccessfully to carry out such attacks (the previously acknowledged difficulties of conducting such studies notwithstanding).

The theory presented here also raises many new empirically tractable questions, for example concerning the relationship between local and extended fusion. Future research should investigate whether perceptions of shared essence are stronger if they are based on direct observation rather than on the testimony of others. Would remembering who else was there alongside you in a decisive battle or a traumatic rite of passage, or perceiving shared phenotypic traits in a sibling, provide more compelling evidence of shared experience or shared biology than merely displaying the same kind of medals or reciting myths of shared ancestry? Relational ties to a local group often incorporate episodic memories for self-defining events, which other group members indelibly inhabit. By contrast, categorical ties to an extended group are based largely on 'knowing that' certain identity markers serve as indirect testimony to shared experience. Indirect evidence of shared experience may not be capable of motivating acts of self-sacrifice to the same extent as bonds forged through

episodic memories of shared ordeals within a band of brothers.

Research into the causes of extreme progroup action is not merely of scientific interest – there is potential also to use the findings in practical ways. For example, de-radicalizing Islamist militants might be re-framed as a process of *de-fusing* extremists. Given that we now have a well-substantiated account of the causal pathways to fusion, together with evidence that priming the mediating variables in this pathway increases fusion (e.g. Whitehouse et al. 2017), it may be possible to reduce the effects of mediating variables so as to obstruct or reverse the fusion process. This has yet to be demonstrated in practice but the general approach is well motivated theoretically. Such an approach should not be confused with the notion of 'de-programming' because the goal would not be to alter people's beliefs or goals against their will. Indeed, the aim would not be to challenge the validity of ideologies or doctrines at all but only to facilitate a process of reflection on past experiences and their relevance to group alignments. The process would need to engage the wider participation not only of extremists but also members of their social networks and surrounding communities (such as parents, school teachers, religious leaders, and others), although the ethics of any interventions would require careful scrutiny and monitoring.

Yet another potential application of this new framework would be neither to create nor to obstruct group alignments but to harness existing ones. There are a number of potentially desirable ways in which this could be done, not least in rebuilding societies devastated by conflicts or natural disasters. For example, during the uprising of 2011, many Libyans fought passionately and at huge cost to clear the way for a prosperous future under a more consensual system of governance. The social

cohesion needed to build that vision was available in abundance at the end of the revolution but there was a failure to harness it for the public good both on the part of the international community and Libyan leaders vying for power at the time. The same pattern repeats itself endlessly in other conflicts around the world. Only by understanding better the underlying causes of pro-group commitment, can we benefit from its potential for building trust and cooperation while limiting its capacity to stoke intergroup conflict.

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