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The power of swearing: What we know and what we don't

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Abstract

Swearing produces effects that are not observed with other forms of language use. Thus, swearing is powerful. It generates a range of distinctive outcomes: physiological, cognitive, emotional, pain-relieving, interactional and rhetorical. However, we know that the power of swearing is not intrinsic to the words themselves. Hence, our starting question is: How does swearing get its power? In this Overview Paper, our aim is threefold. (1) We present an interdisciplinary analysis of the power of swearing ('what we know'), drawing on insights from cognitive studies, pragmatics, communication, neuropsychology, and biophysiology. We identify specific effects of swearing, including, inter alia: emotional force and arousal; increased attention and memory; heightened autonomic activity, such as heart rate and skin conductance; hypoalgesia (pain relief); increased strength and stamina; and a range of distinctive interpersonal, relational and rhetorical outcomes. (2) We explore existing (possible) explanations for the power of swearing, including, in particular, the hypothesis that aversive classical conditioning takes place via childhood punishments for swearing. (3) We identify and explore a series of questions and issues that remain unanswered by current research/theorising ('what we don't know'), including the lack of direct empirical evidence for aversive classical conditioning; and we offer directions for future research.

Keywords: Swearing; Power; Cognition; Emotion; Pragmatics; Hypoalgesia

1. INTRODUCTION

Swearing refers to the use of specific, negatively charged and often emotionally loaded terms, which are taboo in a given language/culture and thus have strong potential to cause offence (Beers Fägersten, 2012; Beers Fägersten and Stapleton, 2017, in press; Jay, 2018a; O'Driscoll, 2020). It can be described as the use of words that 'have the potential

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to be offensive, inappropriate, objectionable, or unacceptable in any given social context' (Beers Fägersten, 2012: 3). However, precise definitions and criteria are sometimes difficult to pin down. For example, there is a debate in the literature about whether swear words can be used with literal (as opposed to figurative) meaning (see Andersson and Trudgill, 1990; Pinker, 2007; Ljung, 2011; Dynel, 2012). Singleton (2009) proposes a threefold set of necessary features for swear words: they relate to tabooed domains, have the potential to produce catharsis, and have literal and non-literal senses. The list of what 'counts' as a swear word may also vary cross-culturally and at different points in time, encompassing issues such as disease, animals, death and relationships, to take just a few examples that might not be considered in standard studies of swearing (McEnery, 2006; Ljung, 2011; Allan, 2018). There is also some conceptual and functional overlap between swearing and other categories of taboo language use such as slurs (terms of disparagement used to discredit another person or group) and the use of discriminatory language (for example, directly referencing race or other personal features) (Allan, 2015, 2018; O'Driscoll, 2020).

In modern times, most recognisable swear words fall into one of three core categories: religion (e.g., damn, hell); sex and sexual body parts (e.g., fuck, cunt, prick); and words related to bodily excretions (e.g., piss, arse, shit) (see Hughes, 1998; Stapleton, 2010; Beers Fägersten and Stapleton, in press). With reference to these categories, Hughes (1998: 4) notes that 'swearing shows a curious convergence of the high and the low, the sacred and the profane'. Of course, even within these categories, there is some conflation, for example, between sexual versus excretory functions and body parts. There is also variation in the offensiveness of some of these core words/categories over time. Thus, the religious category, while still containing recognisable swear words, is likely to be less offensive to many people in contemporary society than it might have been in the past, and/or to constitute, today, a 'milder' form of swearing than many of the words in the sexual/excretory categories. By contrast, the '"lower" physical faculties of copulation, defecation and urination' (Hughes, 1998: 4) have become much more prominent as swear word referents.

The brief discussion above highlights some of the complexity inherent in academic and conceptual mappings of the topic. Nonetheless, as discussed by Beers Fägersten and Stapleton (in press), most people have a general working idea of what is meant by 'swearing' and moreover, will be able readily to identify prototypical swear words in their own language, regardless of whether they routinely swear themselves. In attempting to isolate swearing, conceptually, from other forms of taboo language, O'Driscoll (2020) highlights one core defining feature: that is, the potential for such words, *through their very utterance*, to be offensive and to arouse negative reactions from others. Thus, swearing is, by its very nature, a taboo activity. As such, it is often socially sanctioned, or punished, through a variety of informal and formal mechanisms (for example, fines, social disapproval, censorship, removal). However, this aspect of swearing does not in any way diminish the frequency or spread of its use. Indeed, as we will argue in this paper, the taboo nature of swearing is key to its power as a linguistic activity. Beers Fägersten (2012) has identified an unexplained Swearing Paradox, whereby the most highly offensive terms occur with highest frequency in many contexts of interaction (see also Rosenberg et al., 2017; Jay, 2018a).

We must assume, then, that swearing fulfils some particular functions that are not easily achieved by other forms of language use (Stapleton, 2010). In this paper, we draw together a growing body of research from a range of disciplines to highlight one key finding: *Swearing is powerful*. It produces a range of distinctive psychological, physiological, and emotional effects, as well as unique interactional and rhetorical outcomes. In a previous review of the biopsychosocial effects of swearing, Vingerhoets et al. (2013: 296) note that 'swearing serves multiple intra-individual as well as inter-individual functions', thereby drawing attention to the psychological/physiological and the social effects that it produces (see also, Jay, 2009; Stephens et al., 2009; Stapleton, 2010; Christianson et al., 2017; Beers Fägersten and Stapleton, in press). Here, we will focus on such effects specifically through the lens of *power*; that is, the idea that swearing does (and can do) things that other language forms do not. In addition, we are interested in what (surprisingly little) is known about *how swearing comes to hold this power* for individuals and societies alike, and this issue forms a second key theme of our discussion.

The aim of the paper is threefold. (1) We present an interdisciplinary analysis of the power of swearing, drawing on insights from pragmatics, communication, neuropsychology, cognitive studies, and biophysiology. (2) In light of this, we then outline existing (possible) explanations for the power of swearing. (3) Finally, we identify and explore a series of questions and issues that remain unanswered by current research/theorising, and we offer some directions for future research. In relation to the third aim, we are not proposing to provide conclusions or answers to the questions that we raise. Rather we see the identification of these issues and gaps in knowledge as a core and novel focus of the overview paper. These aims broadly equate to the sections below. In Section 2, we explore findings from a series of studies, which underline the powerful and unique effects of swearing. In Section 3, we summarise these findings ('what we know'), and in Section 4, we outline possible explanations for the effects of swearing. In Section 5, we reflect upon the current gaps in knowledge ('what we don't know'). Section 6 concludes with a mapping of directions for future research.

2. THE POWER OF SWEARING: INTERDISCIPLINARY PERSPECTIVES

Ross (1960) and Montagu (1967/2001) proposed a fundamental and widely cited distinction between *annoyance* versus *social* swearing. The former is primarily intrapersonal in purpose, providing emotional relief and a form of stress management. It is usually negatively charged. Social swearing, on the other hand, serves interpersonal functions, such as group bonding and impression management. Most social swearing is seen as positively charged. In this paper, we do not adopt Ross's/Montagu's delineation in its entirety, focusing instead on the power of swearing exhibited in different research domains, and considering, also, the fact that 'emotional' forms of swearing may be positively *or* negatively charged. However, the interpersonal versus intrapersonal dimension is central to our exploration of the power/effects of swearing (see also Vingerhoets et al., 2013). The research discussed in this section, then, may be broadly categorised as dealing with intrapersonal effects, such as cognition and physiological activity *or* with interpersonal effects such as emotional expression, social interaction and identity management. The studies cited are drawn from a range of research fields, including communication, psychology, biophysiology, and linguistics/pragmatics. In synthesising findings from these sometimes disparate arenas, we aim to explore the ways in which swearing is *different* from and *more powerful* than other forms of language use.

2.1. Emotional force, catharsis and arousal

Emotion is central to both lay and academic understandings of swearing. Allan (2018: 12) describes swearing as 'the strongly emotive use of taboo terms'; while Jay (2018a) states that the two defining features of swear words are emotional intensity and negative valence. In a study of online responses to celebrity swearing, Stapleton (2020) has shown that emotionality and offensiveness are also common *perceptions* that hearers form about swearing. In addition, a number of studies have found that the expression and/or release of negative emotions is cited by participants as a primary motivation for swearing (Stapleton, 2003; Rassin and Muris, 2005; Jay, 2009; Jay et al., 2006; Baruch et al., 2017). Similarly, in a self-report study by Popuşoi et al. (2018), road drivers reported using swearing both to express verbal aggression, and as a form of catharsis that enabled them to cope with feelings of anger in stressful road situations.

Hence, there are strong associations between swearing and emotional release/expression. A couple of conceptual distinctions should be drawn here, which are discussed further in Section 2.6. First, the idea of *expressing* emotion through swearing is distinct from emotional release or catharsis in that the former is interpersonal in nature, while the latter is more akin to the idea of annoyance swearing at the intrapersonal level. Second, emotional expression in the interpersonal domain may convey positive *or* negative affect. In light of this, it may be concluded that swearing provides a uniquely potent means of both achieving catharsis and conveying the speaker's emotional state to others.

A related issue is that swearing is felt by speakers themselves to *possess an emotional force*, which is not shared by other language forms, and which in turn makes it amenable for the expression of strong emotion (Dewaele, 2004). In fact, Jay (2009) proposes an 'emotional tag' hypothesis, whereby speakers select swear words for emotional expression, depending on their relative offensiveness. A large body of research in this area comes from self-report studies of *multilingual* speakers, which investigate emotion and language preferences (see Dewaele, 2004, 2010; Pavlenko, 2012). Interestingly, and of core relevance for the present paper (see Section 3), such studies have consistently shown that for multilingual speakers, swearing in a first language (L1) is perceived to have greater emotional intensity than swearing in languages acquired later in life (LXs) (Dewaele, 2004, 2010, 2013, 2018; Pavlenko, 2012; Shakiba, 2019; Shakiba and Dewaele, 2022; Shakiba and Stapleton, 2022; Vélez-Uribe and Rosselli, 2019). Thus, for multilingual speakers, the L1 is usually the preferred language for emotional swearing; although this preference is moderated by socio-cultural, biographical, and personality factors.

A final point to note here is one that will be developed through the sections below. Swearing produces *emotional arousal*. A growing body of research shows that swearing, or sometimes just being exposed to swear words, brings about arousal, demonstrated by changes in physiological and cognitive activity (e.g., Harris, 2004; Eilola et al., 2007; Jay et al., 2008; Stephens et al., 2009; Caldwell-Harris et al., 2011). Such studies are experimental in nature and provide empirical evidence linking swearing with specific arousal-related biopsychological reactions. Again, some of this research has been conducted in a multilingual paradigm; and where this has been done, arousal effects have been shown to pertain more strongly for L1 than for LX swearing. These findings and themes are revisited in more detail in Sections 2.2–2.5 below. Interestingly, there is also some evidence that suggests that the relationship between swearing and emotional arousal is bi-directional. Stephens and Zile (2017) found that experimentally generated emotional arousal in the laboratory setting led to greater swearing fluency by their study participants.

To summarise this section: The association with emotion, common to everyday understandings of swearing, is borne out by research in several areas. Emotion is consistently cited in motivations for and perceptions of swearing, on both a cathartic and an expressive level; swearing is perceived by speakers to carry more emotional force than other forms of

language; and empirical research confirms a strong link between swearing and emotional arousal. Some of these issues are considered in more detail below.

2.2. Neuropsychological activity

Before considering the empirically demonstrated behavioural, cognitive and physiological aspects of swearing, it is useful to note some perspectives from neuropsychology and psycholinguistics. While this still is a developing area of research, it is suggested that swearing may be located and processed in *different parts of the brain* from other speech activities (van Lancker and Cummings, 1999; Harris et al., 2003; Bowers et al., 2011; Vingerhoets et al., 2013; Bergen, 2016; Finkelstein et al., 2016; Finkelstein, 2018; Sulpizio et al., 2019). The emotionality and/or catharsis associated with swearing suggests that it might activate the basal ganglia, amygdala and other parts of the limbic system; these are deep structures in the brain that play a central role in processing memory and emotion. Thus, it has been hypothesised that swearing taps into an ancient and emotional set of response structures, akin to those involved in recognising and responding to threats (Pinker, 2007; Bowers et al., 2011). Processing in the amygdala/limbic system is automatic and impulsive in nature, is difficult to inhibit, and can remain intact following damage to other areas of the brain (Finkelstein, 2018). In effect, then, swear words might be seen to trigger an evolutionary-based 'fight or flight' response in the individual (Stephens et al., 2009), which would partly explain why, in laboratory settings, swear words increase attention and recall, generate heightened autonomic or physiological responses, and produce both pain-relief and heightened stamina/strength (see Sections 2.3–2.5).

While direct empirical research on this 'neurological substrata of expletives' (Finkelstein, 2018: 108) is limited to date, a recent study by Sulpizio et al. (2019) examined the neural processing of bilingual lexical decision-making tasks involving taboo and non-taboo words. This analysis used functional Magnetic Resonance Imaging (fMRI) to explore brain activity across participants and conditions. For present purposes, the key finding of interest is that differences were shown in the type and speed of processing of taboo versus non-taboo items, thus indicating that swearing is treated distinctively by the brain. Further evidence for differential brain location and processing of swear words, and in particular a role for the amygdala/limbic system, comes from the observation that these words are often retained following a language loss (aphasia) caused by trauma to other parts of the brain. Hence, as noted by O'Callaghan (2013: 72): '(a)s people lose aspects of higher cognition because of injury or neurodegenerative disease, their ability to issue volleys of profanity often remains intact'. Again, it might be suggested that this reflects a more automatic or impulsive mode of processing and expression. Coprolalia, a condition in which swearing is frequent and uncontrollable, such as that exhibited by some people who have Tourette's syndrome, also suggests that swear words may be stored and produced using different neural networks from other speech activities (see Vingerhoets et al., 2013; Finkelstein, 2018).

In considering the neuropsychology of swearing, and specifically, the role of the emotional or limbic system, it is useful to note again the distinction between cathartic and socially oriented swearing. Jay and Janschewitz (2008) draw attention to the *degree of consciousness* involved in these two types, noting that cathartic swearing is mostly reflexive or automatic, while social swearing is more consciously managed for interpersonal purposes. In this respect, then, it might be expected that social swearing will involve more higher order brain processing and be less intrinsically emotional in nature. The neuropsychological categorisations discussed in this section would seem to apply more readily to cathartic swearing.

2.3. Attention, memory and interference

A sizeable body of experimental studies have shown that swear words command more attention and lead to stronger memory recall when compared with other non-taboo items.

Memory for swearing is typically measured by presenting participants with a range of taboo and neutral stimuli (e.g., showing written words or playing recordings) and then, at a later point in the experiment, assessing the extent to which the different stimuli are recalled or recognised (Jay et al., 2008; Ayçiçegi-Dinn and Caldwell-Harris, 2009). As noted earlier, much of this research is also concerned with L1/LX comparisons. Most relevant studies further assume that swearing is primarily a form of emotional language and may be measured as such. For example, swearing/taboo is sometimes investigated alongside other types of emotionally tagged language, such as reprimands or endearments (e.g., Harris et al., 2003; Ayçiçegi and Harris, 2004; Caldwell-Harris et al., 2011). The results of the relevant recall tasks show that *swear words are remembered more easily and consistently* than other stimuli (Harris et al., 2003; Mackay et al., 2004; Jay et al., 2008; Ayçiçegi and Harris, 2004; Ayçiçegi-Dinn and Caldwell-Harris, 2009; Caldwell-Harris, 2015; Madan et al., 2017). Moreover, this taboo versus non-taboo memory effect pertains across L1 and LX conditions (Harris, 2004).

Jay et al. (2008) propose that the higher recall for taboo/swear words found in laboratory experiments may be explained by emotional arousal; specifically, that the arousal associated with these words makes them more

memorable. Another explanation refers to the degree of cognitive attention and processing that swear words command. While Jay et al.'s own (2008) study found that taboo words were encoded more quickly than non-taboo words, other studies indicate more in-depth cognitive processing and higher cognitive salience for taboo items. For example, in Sulpizio et al.'s (2019) study, discussed in Section 2.2, taboo words were found to be processed more slowly, but more accurately, compared with neutral items. Swear words have also been shown to *cause interference* with the processing of other stimuli, thereby suggesting higher attention and salience (Colbeck and Bowers, 2012; Donahoo et al., 2022). One method of studying this phenomenon is through *attentional blink*, which shows temporal distraction or limitation in people's visual attention to sequential stimuli (Raymond et al., 1992; Shapiro et al., 1997). The subsequent salient stimulus is often undetected by participants if it is presented within their attentional blink. In rapid sequential visual processing tasks, participants showed a large blink following a taboo distractor and significant interference and delay in processing the subsequent stimuli (Mathewson et al., 2008; Colbeck and Bowers, 2012). Interestingly, this effect is present, but in reduced form, when taboo words are presented in a second or non-native language (see Caldwell-Harris, 2015).

Further evidence for the cognitive salience of swear words comes from *Stroop task* experiments, which measure the delay in time between the processing of congruent and incongruent stimuli (lists of colour names printed in matched or unmatched colours of ink) and thus the degree of cognitive interference shown by participants in response to these. A modified version of this task called the emotional Stroop (Williams et al., 1996), uses emotional and neutral lists of words, again printed in various colours of ink: participants are asked to name the ink colour in both (emotional versus neutral) conditions. Emotional words generally lead to a longer response time, i.e. they produce more interference than neutral words. In a further modification, taboo words have been included as distracting stimuli. In this latter type of task, *taboo* distractors have been shown to slow response latencies to colour naming, and therefore to produce more interference (higher Stroop effects), than either neutral words or even other types of emotional word (Mackay et al., 2004; Eilola et al., 2007; Eilola and Havelka, 2011; Colbeck and Bowers, 2012). Much research in this paradigm has investigated multilingual swearing. The evidence for relative Stroop effects in L1 versus LX processing of taboo is, to date, mixed. For Greek/English bilingual speakers, Eilola and Havelka (2011) found that the taboo Stroop effect did not differ significantly across their languages. Colbeck and Bowers (2012), however, found less interference from second language swear words for Chinese/English bilinguals, thereby suggesting more arousal/attention for L1 taboo. In this regard, further research with multilingual speakers is needed to tease out the precise relationships among language choice, taboo and emotional arousal.

To summarise this section: In a variety of laboratory tasks, swear words are shown to be better remembered, to require greater attention and processing, and to produce higher levels of interference with the processing of other stimuli, compared with neutral, or even other emotion-related, words.

2.4. Autonomic activity

The autonomic nervous system (ANS) regulates a range of involuntary body functions such as breathing, heart rate, blood flow and digestion. It is also involved in responding to imminent danger, as part of the 'fight or flight' reaction. Thus it 'responds to danger or threat cues by readying systems of the body to take action, including fighting or fleeing' (Harris, 2004: 225). Adrenaline is released into the blood stream as part of this response, bringing about changes that prepare the body for action: for example, increased heart rate, sweating, faster breathing. It is therefore possible to examine changes in the ANS (autonomic responses) by measuring specific body function rates. In swearing research, the two most common ANS measures used are *heart rate* and *skin conductance rate* (SCR). The latter forms the main measure in most of the studies discussed in this section. SCR is explained by Caldwell-Harris et al. (2011: 335) as follows: 'Threatening stimuli engage the flight or fight system, which. . . leads to the sweating that increases the transient conductivity of the skin.'.

In a standard experimental paradigm, participants are exposed to (or less frequently asked to produce) a series of verbal stimuli (written or auditory presentation), including taboo/swear-words, neutral words, and sometimes other categories such as non-taboo emotion-words or euphemisms for taboo words. Some of these studies are the same as those cited in relation to attention and memory in Section 2.3. In general, work within this paradigm treats swear words as a category of emotional language and again, there is sometimes a bilingual/multilingual dimension to the analyses. Heightened autonomic activity is generally explained by and taken as evidence of increased emotional arousal (Stephens et al., 2009; Pavlenko, 2012). Autonomic measures are established at 'baseline' (prior to any exposure to stimuli) and again following each of the (taboo/non-taboo) stimuli conditions. In this way, autonomic changes can be identified, and comparisons drawn across the different experimental conditions.

Such studies have consistently shown that *swear words produce heightened SCRs* compared with other verbal stimuli (Harris et al., 2003; Harris, 2004; Jay et al., 2008; Bowers et al., 2011; Eilola and Havelka, 2011; Tomash and Reed,

2013). With respect to this, L1 swear words usually produce a larger SCR than do those from later learned languages (Eilola and Havelka, 2011; Pavlenko, 2012; Caldwell-Harris, 2015). Furthermore, in a series of experiments on the pain-relieving effects of swearing (see Section 2.5), Stephens et al. (2009) and Stephens and Umland (2011) showed that *participants' heart rates increased when swearing* compared with uttering a neutral word. However, related work by Stephens and Robertson (2020) and Stephens et al. (2018) did not find evidence of changes to heart rate under swearing conditions. The results for this autonomic measure, then, appear less consistent than for SCR, although a number of variables differentiate the experiments in question, including exposure to versus production of taboo, and the extent to which participants were engaged in other activities while swearing, which might in themselves have affected their heart rate.

To summarise: Swearing has been shown to increase autonomic activity, in particular SCR, but also, in some studies, heart rate. These changes may be interpreted as evidence of emotional arousal. With respect to the 'fight or flight' ANS response, swearing/exposure to swearing, at least under laboratory conditions, is usually taken as representing a negative emotional response.

2.5. Pain relief, stamina and strength

A significant body of research conducted by Stephens and colleagues has established that swearing has *hypoalgesic*, or pain-relieving, effects (Stephens et al., 2009; Stephens and Umland, 2011; Robertson et al., 2017; Stephens and Robertson, 2020). In a series of experiments, participants were asked to hold their hands in an ice water bath (*cold pressor*) for as long as they could tolerate, while vocalising swear words versus other (usually neutral) words. Pain tolerance was measured as the length of time that the participants could keep their hand in the water. The condition order (swearing versus non-swearing) was randomised across participants to avoid order effects. As noted above, heart rate was also monitored in a number of experiments.

Across the experiments, *swearing was shown to significantly increase the participants' pain tolerance*, thereby producing a demonstrable hypoalgesic effect. In addition, under the swearing condition, the participants' pain threshold (the point at which they reported feeling pain) increased; while pain perception (the degree to which they rated the experiment as painful) was lowered. Notably, Stephens and Umland (2011) found that the hypoalgesic effect was *moderated by habituation* to swearing. Participants who reported swearing frequently in daily life showed less increase in pain tolerance under the swearing condition, compared with those who reported less frequent use of taboo language. While most of this work was undertaken with English speakers (and all with L1 speakers), Robertson et al. (2017) showed that Japanese speakers also extended their pain tolerance while swearing, which suggests that the swearing-hypoalgesia link is universal. Interestingly, there is some evidence that swearing may also reduce the social pain of ostracism (Philipp and Lombardo, 2017).

Emotional arousal appears to provide the most feasible explanation for the hypoalgesic effect (Stephens et al., 2009; Stephens and Robertson, 2020). As discussed in Section 2.4, in some of the cold pressor studies, heart rate increased under the swearing condition, compared with both the baseline resting rate and the neutral word condition (Stephens et al., 2009; Stephens and Umland, 2011), thereby showing increased autonomic activity. Stephens and Umland (2011: 1278) state that 'these consistent heart rate increases are important as they show that swearing produces a somatic effect, in turn indicating a pain-reducing mechanism over and above cognitive distraction'. Moreover, because the Japanese participants in Robertson et al.'s (2017) did not have a cultural script for swearing as a response to pain, the association cannot be seen as learned or culturally scripted. It is thus most likely to be linked to activation of the autonomic system. One possible alternative explanation for the hypoalgesic effect is distraction (see reference to Stephens and Umland above); that is, that participants are distracted from pain by the novelty/shock of swearing. Stephens and Robertson (2020) tested this hypothesis using novel swear words, which resembled conventional swear words in their lexical form and were rated as both emotional and humorous by participants (see also Section 4). In the cold pressor experiment, however, these words did *not* produce a hypoalgesic effect, while conventional swear words did. These results provide further evidence supporting an emotional arousal basis for the pain alleviation effect of swearing (Stephens and Robertson, 2020: 9).

In a related study (not cold pressor-based), Stephens et al. (2018) found that muscular performance (strength and power) for physical exercise tasks increased when participants repeated a swear word compared with a neutral word. In this study, however, there was no concomitant escalation in autonomic activity, so the basis for the power/strength gains remains unclear. Possible explanations offered by the researchers include a moderating role for the hypoalgesic effect (i.e., that the physical tasks were made to seem less onerous because of the swearing-induced hypoalgesia, thus allowing increased effort); or a generalised disinhibition effect brought about by swearing. Despite the lack of evidence for autonomic activation, there was a consistent pattern of results demonstrating that swearing increased strength and power/performance relative to not swearing. A more recent set of experiments by Stephens et al. (2022) also found that

repeating a swear word increased participants' physical strength, measured in grip and arm strength. The fact that this outcome has been found consistently across the studies suggests that it is a reliable effect.

To summarise: In cold pressor studies, swearing produces a hypoalgesic effect, increasing pain tolerance and pain threshold, while reducing pain perception. Swearing also increases power and strength in physical activity tasks. While the most feasible explanation for hypoalgesia is emotional arousal, this is borne out by autonomic measures in only some of the relevant experiments.

2.6. Interpersonal and rhetorical effects

The potentially offensive nature of swearing gives it a unique facility for interpersonal and rhetorical purposes (Stapleton, 2010; Vingerhoets et al., 2013; Beers Fägersten and Stapleton, in press). Part of this facility may come from the emotional arousal discussed in the preceding sections; although, as also noted earlier, not all swearing is primarily affective in nature or purpose. In addition, some of the power of swearing to bring about specific interactional and rhetorical effects may come from its violation of normative social expectations (Johnson and Lewis, 2010; Johnson, 2012). In this section, we will explore a range of interpersonal and rhetorical applications of swearing, classified broadly into negative and positive functions.

Building on Ross's (1960) and Montagu's (1967/2001) distinction between social and annoyance swearing, Wajnryb (2005) notes that swearing may function as *cathartic*, *social*, or *abusive*. While the first two functions approximate to annoyance and social categories respectively, the third, abusive swearing, is negatively valenced and interpersonally oriented, having the aim of directly insulting or offending. A slightly different taxonomy is provided by Allan and Burridge (2006), who identify four overlapping categories of swearing: *social* (marking in-group solidarity); *abusive* (offending or insulting); *stylistic* (making the message more emphatic or engaging); and *expletive* (expressing an emotion, such as frustration, anger or surprise). From the perspective of interpersonal pragmatics, Stapleton (2010) identifies four generally positive purposes of everyday swearing: *expressing emotion* (conveying affective responses, such as joy, anger, excitement, fear); *humour and/or verbal emphasis* (similar to Allan and Burridge's stylistic category); *social bonding and solidarity* (building harmonious relations and/or expressing affiliation); and *constructing and displaying identity*. It should be noted that these interactional functions are highly context-dependent, varying with, for example, the formality and purpose of the situation, demographic features of the interlocutors, individual swearing tolerance, socio-cultural expectations, and perceived intentions of the swearer, as well as the medium/channel of communication and the surrounding linguistic/discursive context (Bayard and Krishnayya, 2001; Beers Fägersten, 2012, 2017a, 2017b; Beers Fägersten and Stapleton, 2017; Christie, 2013; Jay and Janschewitz, 2008; Johnson, 2012; Johnson and Lewis, 2010; Stapleton, 2010, 2020; Kapoor, 2016).

2.6.1. Negative interpersonal functions

Swearing is conventionally associated with the expression/release of negative emotions, such as anger and frustration; and as discussed in Section 2.2, a range of research studies also identify this function as a primary motivation for swearing. Swearing is an exceptionally powerful vehicle for conveying the speaker's emotional state, or for intensifying the expression of emotion (McEnery and Xiao, 2004). It is important to note again, here, that swearing can be used to express both positive *and* negative emotions, including, in the positive category, joy, excitement, and anticipation. Nonetheless, a commonly accepted purpose (and perception) of swearing is the display of adverse feeling by the speaker. In the interpersonal domain, this is closely related to the expression of, *inter alia*, impoliteness, hostility, offensiveness and verbal aggression (Allan 2018; Culpeper, 2011, 2018; O'Driscoll, 2020). From a pragmatic perspective, swear words are *in themselves, offensive*: "Uttering them transgresses polite social norms regardless of their denotation or what they are used to refer to" (O'Driscoll, 2020: 42). Thus, the very act of choosing to swear is tabooed behaviour, and, in many situations, is likely to cause offence.

Swearing may be used to *directly insult or abuse* others and/or to intensify an insult (Culpeper, 2011; Allan, 2015). For instance, a speaker may directly address somebody in tabooed terms (e.g., *fuck off*) or may use a slur (i.e., an expression of disparagement) to discredit another person or group (e.g., *dickhead, asshole*). In these cases, swearing is used directly as impoliteness strategy with the deliberate intention to cause offence to others (see Culpeper, 2011, 2018; Dynel, 2012; Christie, 2013; O'Driscoll, 2020). Even when swearing is not directly aimed at another person or group, its use is often interpreted in a more generic sense as *displaying aggression* (Jay, 2009, 2018a). Thus, a swear word used in anger or frustration (e.g., *Where are they fucking going?*), even if not directed at those co-present, may be felt by listeners to convey messages of aggression, hostility, or dominance (see de Klerk, 1991; Jay, 2018a; O'Driscoll, 2020). Indeed, speakers may be conscious of these messages and use them to strategic effect, even when not directing swearing at their interactional partners. For example, Baruch et al. (2017) found that for some of their respondents, swearing was perceived as a means of conveying authority and urgency in professional and managerial settings.

2.6.2. Positive interpersonal functions

Despite its conventional association with negative emotion, much everyday use of swearing is *not* aimed at aggression, impoliteness, or even the expression of negative feelings (Jay and Janschewitz, 2008; Stapleton, 2010; Dynel, 2012; Beers Fägersten and Stapleton, 2017, in press). Swearing is multifunctional, context-dependent and shaped by social and community norms. For example, Dynel's (2012) study of YouTube commentaries in an e-community of practice shows how swearing was used to both abuse, vent, and create hierarchy *and* to promote solidarity and affiliation among users. Hence, 'no linguistic forms are inherently imbued with politeness or impoliteness… cursing may actually be a manifestation of politeness within a given community of practice' (Dynel, 2012: 26). To the extent that meaning and outcomes differ depending on the context of use, swearing is, of course, similar to other forms of language use. However, as discussed in this section, the taboo nature of swearing appears to *heighten* its potential for achieving positive interpersonal purposes. Once again, swearing may be seen as more 'powerful' in this respect than other language choices.

Conversational swearing is often used to *manage social relations and/or social interaction*. Because it is proscribed and censured in so many settings, when it is used among friends or peers, it may have connotations of *camaraderie/-solidarity*, especially where the group faces adversity or opposition (Daly et al., 2004; Baruch and Jenkins, 2007; Robbins et al., 2011; Karachaliou and Archakis, 2015). In addition, where it is part of the normative practice of a group, swearing can function as a direct *act of affiliation with the group* (Stenström, 2006, 2017; Baruch and Jenkins, 2007); a way in which speakers (e.g., teenagers, workers, sports team members) can signal their support of and attachment to the group in question. Moreover, because it is not possible for most people to swear indiscriminately across all contexts, swearing often marks an *informal, relaxed context* wherein social bonds are strengthened and social distance is reduced (Beers Fägersten, 2012). Beers Fägersten's (2017a) analysis of the highly successful Swedish YouTuber PewDiePie's use of English swear words shows that swearing may also be used to create this sort of environment and build (para-)social relationships in online settings. Similarly, swearing may be used at the interpersonal level to *signal intimacy and trust*. This function again derives directly from its generally proscribed nature, the key message being that 'I trust you enough to swear in your presence' (Stapleton, 2003, 2010; Baruch et al., 2017; Beers Fägersten and Stapleton, in press). Because swearing is generally more proscribed for women than for men, this intimacy effect is particularly prevalent for women (Stapleton, 2003). In all of these examples, swearing acts as a *positive politeness signal*: a way of building relationships, signalling positive affect, and potentially, a means of mitigating face-threatening acts (Daly et al., 2004; see also Dynel, 2012).

Swearing may also be used for *rhetorical and stylistic* purposes: to enhance the effectiveness and impact of the message and/or the credibility of the speaker. As discussed in Sections 2.1–2.5, swearing creates emotional and physiological arousal and heightens attention, and memory recall. In turn, this can bring about potent stylistic, rhetorical, and interpersonal effects. For example, swearing is a powerful means of *gaining attention* from listeners in both conversational and professional settings. It can be used to focus concentration and to *emphasise key points or issues* (Generous et al., 2015; Baruch et al., 2017). This function is also important for conversational story-telling, where swearing can significantly enhance the tellability of the narrative (Norrick, 2012; see also Karachaliou and Archakis, 2015). Kwon and Cho (2017) have shown that swearing can be used to attract and direct attention in online environments; while Beers Fägersten and Pereira (2021) have argued that the markedness of swear words allows them to be commodified to sell products. Judiciously used, swearing can also *increase credibility and/or persuasiveness* of both messages and speakers themselves. In evaluations of constructed testimonies/messages, Rassin and Van Der Heijden (2005) and Scherer and Sagarin (2006) found that texts containing swear words were judged as more believable and/or persuasive than those without. In addition, Cavazza and Guidetti (2014) found that the inclusion of swear words in fictitious blogs enhanced participants' evaluations of hypothetical political candidates. It is worth noting here, however, that some studies of credibility and persuasiveness have identified negative outcomes of swearing, particularly in professional settings (see Stapleton 2020 for an overview).

Finally, swearing may be used as an *identity resource*: to present and manage the impressions conveyed to others. At an individual level, swearing may be seen as *part of somebody's personality* or their personal style of communication (Generous et al., 2015; Beers Fägersten, 2017a). Swearing also indexes certain group-based identities, ranging from broad social categories, such as age and gender (McEnery and Xiao, 2004), to specific work/friendship/practice-based communities (Stapleton, 2003; Daly et al., 2004; Dynel, 2012). In this way, swearing (or choosing not to swear) is a means of *asserting or claiming a group-based identity*, which may or may not be congruent with one's personal style. At the group level, swearing can be used by members themselves to demarcate the boundaries of in-group membership versus outsider status: e.g., in work or sports teams or age-based groupings (Baruch and Jenkins, 2007; Stenström, 2017). Finally, swearing can be used to construct *particular versions* of identity by indexing different group-based identities simultaneously: e.g., 'milder' versions of swearing associated with femininity, idiosyncratic

swearing used to navigate religious concerns, and the indexing of 'bawdy' identities and vernacular speech styles (see Stapleton, 2003; Troutman, 2006; Dutton, 2007; Bednarek, 2015).

3. TO SUMMARISE: WHAT WE KNOW

Swearing differs from other language use in producing a range of distinctive cognitive, physiological and interpersonal effects. Thus, it possesses a potency and force that is not shared by other linguistic activities. From the interdisciplinary review of the literature presented in Section 2, the following points can be extrapolated.

I. Swearing shows strong links with emotion, on both a cathartic and expressive level. It is often motivated by affective concerns; is perceived by speakers to contain emotional force; and in laboratory studies, is shown to produce emotional arousal.
II. Swearing may be differently located and processed in the brain compared with other speech activities. Specifically, it may activate the amygdala and basal ganglia, rather than higher order processing structures. It is often retained in aphasia and used automatically or compulsively in coprolalia.
III. Swear words produce higher memory recall and require greater attention and cognitive processing than other linguistic stimuli. When present as distractors, they produce higher levels of interference with the processing of other stimuli.
IV. Swear words produce increased autonomic activity, in particular skin conductance (SCR), but also, in some studies, heart rate.
V. Swearing produces a hypoalgesic effect, increasing pain tolerance and pain threshold, while reducing pain perception.
VI. Swearing increases power and strength in physical activity tasks.
VII. When used in spoken interaction, swearing produces a range of contextualised interpersonal and rhetorical effects. It provides a uniquely powerful means of emotional expression, and of achieving both positive *and* negative interpersonal relations. It also potentially shapes persuasiveness/credibility of messages.
VIII. The emotional, cognitive and autonomic effects of swearing (i, iii-iv) are generally stronger in a first language L1 compared with LX languages, although this effect is moderated by acquisition, biographical and personality factors.
IX. Emotional arousal associated with swearing is the most feasible explanation for the cognitive and physiological effects identified in laboratory studies (iii-vi); and indeed, autonomic activity is itself taken as evidence of emotional arousal. However, increases in autonomic activity have not been universally demonstrated in all relevant studies.

In considering i-ix, a few additional points should be noted. We have extrapolated these findings from a range of research paradigms with the aim of identifying concrete empirical themes. However, it is evident that some of the issues and concepts overlap. In particular, while emotion is a salient and multi-faceted category in its own right, *emotional arousal* has been offered as an explanation for a number of the other effects. It is also important to bear in mind that the experimental studies of cognition, autonomic response and hypoalgesia differ from the interpersonal and pragmatic analyses in key respects. The experimental studies almost exclusively start from the assumption that swearing indexes emotion, usually negatively valenced. In these studies, also, swear words are necessarily presented/elicited in isolation and/or under controlled conditions. It is possible that the incongruity of encountering swearing in a formal research/laboratory context (cf. Johnson and Lewis, 2010) may, in itself, generate an autonomic response that would not have occurred in a more informal setting and/or if the swear words were encountered in the flow of other discourse. Conversational swearing, on the other hand, is used for a variety of purposes, as discussed in Section 2.6; and it may be used to express positive as well as negative affect. Moreover, it is clear that not all conversational swearing directly indexes emotion, with other uses being habitual, humorous, or politeness-based, to take just a few examples.

We are not attempting to provide, here, a unitary framework within which all of the above findings may be coherently integrated and explained. Rather we are interested in what they reveal about the *power of swearing*: that is, about how swearing differs from other forms of language use, and the specific potencies that it provides for cognitive, emotional, physiological and interactional purposes. In the next section, we explore possible sources of this power.

4. WHERE DOES IT COME FROM? POSSIBLE EXPLANATIONS

As discussed, emotional arousal is a feasible explanation for at least some of the empirically observed power of swearing. However, accepting this explanation really just pushes our question to another (meta-) level. Whether we treat emotional and other effects as interconnected or discrete, we are left with the question of *where and how* swearing

acquires its emotional, cognitive, physiological and interactional effects. Although there is necessarily some societal and cultural consensus on what constitutes swearing, we are specifically interested here in how swearing acquires its power *at the individual level*: that is, we are interested in the process through which it comes to produce the effects described in Sections 2 and 3.

An initial suggestion is that the power of swearing may reside in the phonology/structural properties of the words themselves. Indeed, there may well be some commonality among the sound/phoneme types; for example, the use of plosives is characteristic of many swear words (Stephens et al., 2018; Vallery and Lemmens, 2021). However, this issue does not, in itself, provide a realistic explanation, for a number of reasons. Swear words constitute only a tiny subset of the lexical items that contain plosives (and/or any other relevant phoneme type); and these other lexical items do not bring about the effects that swearing does. In addition, when learning or speaking an unfamiliar language, speakers do not automatically know/respond to the swear words contained therein. A topical illustration of this was the British tennis player, Emma Radacanu's inadvertent use of Italian swearing (*che cazzo?*) in a televised interview.[1] Radacanu had been playing in the Italian Open tennis tournament in Rome and was being interviewed (in English) for Italian television. When asked by the interviewer whether she had learned any Italian, she said that a friend had taught her 'che cazzo?' (roughly translated as 'what the fuck?'). Noticing the shocked reaction of the interviewer and several onlookers, she began to exhibit both amusement and embarrassment, asking 'Is that a bad word?' and 'Have I just sworn on camera?', and clearly indicating a lack of knowledge of the words she had just spoken. Thus, swear words do not usually pertain across languages, and it must be concluded that there is nothing intrinsic in the words themselves that identifies them *as* swear words (Beers Fägersten and Stapleton, 2017). As noted by Dynel (2012: 28): 'no words manifest inherent tabooness, being socio-cultural constructs emerging as a result of societal prohibition'. Further evidence that the surface properties of swear words do not produce emotional or other effects comes from Stephens and Robertson's (2020) study of novel swear words, discussed in Section 2.5. The novel swear words (*fouch* and *twizpipe*) resembled conventional swear words in their lexical form and moreover, were rated by participants as both emotion-arousing and distracting. However, in contrast to conventional swear words, the novel swear words did *not* produce a hypoalgesic effect in cold pressor experiments, thus demonstrating that the effects of swearing do not reside in the phonological form. On the other hand, and despite the fact that most prototypical swear words centre on core taboo categories (see Section 1), the power of swearing does not appear to reside in the *meaning* of swear words either. Bowers et al. (2011) showed that euphemisms with the same denotative meaning as swear words did not produce the heightened SCR seen with the equivalent taboo terms.

We must assume, then, that at the individual level, the power of swearing is a *learned association* with particular words (Jay et al., 2006; Stephens et al., 2009; Caldwell-Harris et al., 2011). From this perspective, 'the heightened response to swear words reflects a form of verbal conditioning in which the phonological form of the word is directly associated with an affective response' (Bowers et al., 2011: 1). Exactly *how* this learning or conditioning takes place, however, has not been empirically ascertained. The most widely accepted proposal is that the emotional power of swearing is established in childhood through *aversive classical conditioning*, namely punishment for swearing (Harris et al., 2003; Jay et al., 2006; Caldwell-Harris et al., 2011). Likewise, Pavlenko's (2005) theory of language embodiment, in which language is acquired in tandem with the emotion regulation system, proposes that swear words become negatively conditioned through being affectively 'associated with prohibition and punishment' (Pavlenko, 2012: 421). Jay (2003) explains the classical conditioning process through which words acquire emotional valence. In essence, this account is based on the 'simple contiguity of word with affect' (p.409). In Pavolv's original classical conditioning experiments with dogs, a neutral stimulus (bell) produced a conditioned response (salivating) after being paired repeatedly with an unconditioned stimulus (food), which had originally produced the unconditioned response (salivating). Similarly, words can acquire emotional connotations when they are repeatedly paired with emotional responses and meanings. When a child learns to associate a particular word with emotion-arousing experiences (e.g. hugs, praise, punishment), the word becomes a conditioned stimulus, which will, in its own right, evoke these same experiences and meanings. Moreover, as part of the conditioned response, the child will embody visceral (physiological) and behavioural (approach or avoid) responses to the word. In this way, '[a]rousal becomes part of the meaning of each expression' (p 410) and will be manifested in physiological responses (such as those described in Section 2.4) and emotional feelings on hearing or seeing the word. There are some laboratory studies that demonstrate this process taking place, at least in the short term (see Section 5).

Aversive classical conditioning, then, would offer a viable explanation for the autonomic responses to swearing; in particular, the heightened SCR, observed in experimental studies. As summarised by Caldwell-Harris et al. (2011: 335): 'taboo phrases were previously paired with threatening environmental messages (or punishment for use), and

[1] The video recording of this interview was widely reported and shared online. It may be viewed at: https://www.youtube.com/watch?v=HS-CZ-9HXNk

after repeated pairings, the phrase itself became capable of eliciting a fear response'. In two related studies, Jay et al. (2006) analysed 47 written narratives and 211 survey responses, respectively, from college students regarding memories of punishment for swearing. Their findings showed that most of the participants had received punishments for swearing when they were children and could recall these in some detail. In light of classical conditioning theories, the authors hypothesise a link between these experiences and emotional force/arousal: 'Having to conform to parental rules about cursing and being punished for breaking those rules is a common childhood experience. We suggest that punitive reactions to cursing endow curse words with emotional qualities that contribute to their memorability in autobiographical narratives and laboratory research' (p.129). While these studies provide valuable data on experiences of punishment for swearing, they *do not provide empirical evidence* of a link between such punishment and the effects produced by swearing in later life. It should also be noted that although the authors discuss possible interpersonal benefits to children's swearing, their studies focused specifically on negative memories, and further, that the participants were all from a US college demographic. There is some empirical support for the aversive classical conditioning hypothesis in a small-scale study by Tomash and Reed (2013). This study showed that when reading swear words aloud, the increase in SCR (from neutral reading) was larger for those participants who reported having been punished for swearing as children. However, this was a very small-scale study (N = 26), which measured punishment for swearing on just one survey item before conducting paired, one-tailed t-tests. To date, it appears to be the only empirical study to explicitly test the aversive classical conditioning hypothesis.

Observational and interview-based studies show that swearing starts in very early childhood and that children progress through a series of stages of swearing acquisition (Jay and Jay, 2013; see also Jay, 2018b). Therefore, it does seem likely that strong affective associations with swearing are formed early in life. This suggestion is strengthened by the data on multilingual swearing, specifically, the self-report studies of L1 versus LX emotional force, and the experimental studies of L1 versus LX cognition and autonomic arousal (see Section 2.1). L1 swearing is consistently found to contain more emotional force and to produce greater cognitive and physiological effects than swearing in the LX, thus offering further support to the theories of associative learning, language embodiment, and possibly aversive conditioning (Pavlenko, 2005; Caldwell-Harris, 2015). Nonetheless, it remains the case that there is little direct empirical evidence for the role of punishment in the associative learning process around swearing; and in addition, this theory leaves many questions unanswered and many aspects of the process unaddressed. These are discussed in the next section.

5. UNANSWERED QUESTIONS: WHAT WE DON'T KNOW

As explained earlier, a core aim of this overview paper is to identify current gaps in our knowledge regarding the power of swearing. Thus, in this section, we do not propose conclusions or answers to the issues that we raise, since these are specifically unanswered questions, i.e., 'what we don't know'. In the conclusion, however, we offer some research directions and proposals for taking these issues forward.

The first point to note is one that we have identified above, that is, the *paucity of empirical evidence* for the most commonly accepted theory of aversive classical conditioning and/or language embodiment. Here, we should clarify that for ethical reasons, any such evidence would *not* come from research with children, nor from direct observation of aversive conditioning taking place in childhood. Rather, we are referring here to a lack of empirical evidence that would clearly link the effects of swearing in adulthood to individual experiences of punishment for swearing in childhood (see Section 6). As discussed, there is evidence that adults have memories of being punished for swearing (Jay et al., 2006), but this research does not clearly demonstrate a link between such memories and later effects of swearing. Moreover, while there is experimental evidence that classical conditioning can occur with words and syllables (Razran, 1949; Staats and Staats, 1957; Staats et al., 1961),[2] such studies do not directly address our core research issue for a number of reasons. First, they are not specifically about swearing nor the unique effects that it generates, but rather work with neutral and/or nonsense words and syllables. Second, the conditioning processes are controlled and take place over a short duration in a laboratory setting. In contrast, any comparable process of conditioning for swear words would take place over a much longer period and in a naturalistic and far less controlled environment. Finally, the results of language conditioning are typically measured within the experimental setting, post-intervention. Similar effects for swearing are presumably being observed years after key conditioning events have happened (although as we argue below, there is a need to consider the effects of ongoing swearing experiences, and not just those obtained in childhood). As far as we are aware, there is only one small-scale study that provides direct evidence for the aversive classical conditioning theory with respect to the power/effects of swearing in adulthood. This is the study by Tomash and Reed (2013), discussed earlier, which provides very interesting findings, but is limited by features of design and scale

[2] We are grateful to an anonymous reviewer for pointing this out.

(see Section 4). Moreover, while multilingual swearing research provides some indirect support for the theory, differential responses to L1 versus LX do not, in themselves, provide evidence for memories of punishment in the L1.

Application of the aversive classical conditioning theory also assumes a number of things that we suggest are not universally borne out in children's early swearing experiences. It is assumed, for example, that formative childhood swearing memories were with parents or other authority figures; and that these figures usually responded with sanctions for the child's swearing behaviour. However, while such encounters will undoubtedly feature in people's early memories of swearing (as shown by Jay et al., 2006), we suggest firstly that *not all caregivers will react with sanctions or disapproval*. Cultural and socioeconomic norms mean that swearing is more readily accepted in some groupings than in others and is thus less likely to attract censure from parents/caregivers (Jay, 2018b). In addition, childhood swearing experiences extend beyond the family setting and include interactions with peers and older children. Harris et al. (2003: 565) acknowledge the wider context of childhood swearing memories, noting that 'societal disapproval may be more important than punishment by parents' in forming associative memories. However, not only do the experiences of swearing extend beyond the family, but it is to be expected that some peer-based swearing experiences will involve markedly positive reactions, such as approval, attention, admiration or emulation. These would be expected to act as positive reinforcement, rather than aversive stimulation, but there is currently no research on how these *positive swearing experiences* fit into the development of emotional arousal and responses to swearing later in life (cf. Jay et al., 2006).

The aversive conditioning theory also assumes that all responses to swearing index emotion (usually negative). However, as discussed in Section 2.6, and just above, much everyday use of swearing does not appear to be about emotional expression/release. A lot of routine swearing by adults is conversational in nature and is geared towards managing interpersonal relations and discourse processes. There is currently a gap in our knowledge about *how and when children acquire conversational forms of swearing* (cf. Jay and Jay, 2013; Jay, 2018b) and moreover, about *how conversational swearing relates to the power of swearing*, as discussed throughout this paper. It seems likely that conversational swearing is acquired later than single-word/cathartic swearing, but when does it take place? Do these different types of swearing experience produce different types of associative learning and conditioning? Does conversational swearing itself produce any kind of arousal/autonomic response like that found in laboratory studies of single-word swearing stimuli? It seems reasonable to assume that different forms of swearing practice will moderate the force/power of swearing for individuals. This assumption is based on two observations. As noted in Section 2.5, Stephens and Umland (2011) found that the hypoalgesic effect of swearing in a cold pressor study was moderated by habituation to swearing; and language acquisition factors are shown to moderate the emotional force of LX swearing (see further below).

There is also a lack of research focus on *ongoing experiences and associations with swearing*, including in older childhood, throughout the formative teenage years and into adulthood. While it is likely that early associations are the strongest ones, most people's use of and relationship to swearing will change over the lifespan and in response to the reactions of others in various spheres. In order to understand this issue, we also need to understand the *role of interlocutors and context* in swearing memories and in the associative learning process. For example, where do most formative swearing experiences take place? What are the relationships between those present? Can associative learning *take place vicariously* by hearing another person swear and/or watching the responses of others present?

Finally, there is a lack knowledge about *the role of memory/reminiscence in generating personal meanings* of swearing (Conway and Loveday, 2015; Loveday et al., 2020). How well do people remember their first encounters with swearing? What effect do these memories have on their present relationship with swearing and, indeed, on the various forms of power that we have been discussing in this paper? Furthermore, we do not know *if there is a critical period* for the associative learning that we are assuming shapes responses to swearing in later life. From the multilingual research discussed in Section 2, it is evident that much of the power of swearing in one's first language does not hold (at least to the same extent) for languages learned subsequently. However, acquisition factors play a role here. In particular, earlier age of LX acquisition results in higher (perceived) emotional force for LX swearing (Dewaele, 2004, 2010, 2018). This finding would lend some support to the idea of a critical period, although it should be noted that context of acquisition (naturalistic versus instructional) is found to have similar moderating role. Any consideration of a critical period would also need to take account of ongoing swearing experiences throughout the lifespan. For example, in addition to early childhood experiences and formative periods, it is possible that there is also an accumulation of swearing memories around the 'reminiscence bump' period in adolescence, which Loveday et al. (2020) have shown to be central to self-definition and personal meanings. Experiences of swearing throughout the lifespan are likely to result in ongoing redefinitions of one's personal relationship with swearing, and it is possible (but by no means inevitable) that these processes will also change the 'power of swearing' for individuals over time.

6. CONCLUSION AND FUTURE RESEARCH DIRECTIONS

We have examined research from a range of disciplines in order to detail the power of swearing. We have shown that swearing produces outcomes that are not observed with other forms of language use. These include cognitive, autonomic, interactional, rhetorical, emotional, cathartic, stamina/strength, and hypoalgesic effects. Our core question in relation to this set of findings has been: *How does swearing get its power?* In exploring this issue, we have considered possible explanations, including emotional arousal (the connection of which to swearing, in itself, requires explanation), linguistic concepts of structure, phonology and semantics, and the generally accepted psychological/behavioural concept of aversive classical conditioning. None of these frameworks provides a comprehensive, fully cogent account of how and where swearing acquires its potency. The aversive classical conditioning theory, which associates swearing with memories of childhood punishment, provides a feasible explanation for some of the observed effects described in this paper. However, as detailed in Section 5, it fails to address a number of important issues/complexities around memories and experiences of swearing, both in childhood and throughout the lifespan. Again, we would note that it is neither feasible nor desirable to conduct research with children in relation to this hypothesis. Quite apart from the ethical issues, which would prohibit such research, investigations carried out with children would not actually address our core issue of interest: that is, how the effects of swearing *in adulthood* are related to childhood experiences. Evidence of this process is more likely to come from retrospective and/or comparison-based studies *conducted with adults*, along one or more of the lines that we will now explore.

In taking forward this research agenda, we propose, firstly, that *memory itself* should form a primary empirical focus. Most accounts to date have hypothesised the role of childhood experiences of swearing in forming arousal effects (Harris et al., 2003; Caldwell-Harris et al., 2011), and have moreover, assumed that these early experiences were negative (Jay et al., 2006). We propose that memory could be addressed in a number of ways. A more open-ended biographical, narrative approach to this issue would allow participants to provide their own parameters for the accounts and memories that they produce. Nonetheless, there are some research foci that also need to be followed up, perhaps in a semi-structured elicitation format and/or a quantitative survey. These would include the type of emotions evoked in different swearing experiences (and perhaps reinvoked through memories of these); the context in which swearing took place; the interlocutors and/or bystanders and their relationship to the individual; the consequences of swearing for the individual, in particular, positive versus negative outcomes; and the role of vicarious experiences in forming memories and associations. Discursive and interactional data (e.g., focus groups or interviews) would allow further exploration of these issues, as well as an analytic focus on the rehearsal of autobiographical memory as a means of establishing personal meanings and identity affiliations in relation to these incidents. The age at which formative swearing experiences took place would also be a useful area for investigation in order to explore issues such as critical acquisition period and/or reminiscence bump (Loveday et al., 2020).

A second key research focus should be on *empirical evidence for a link between memories of swearing and the various cognitive, autonomic, and other effects observed in laboratory-based studies*. Exploration of this issue would most likely take place within an experimental paradigm, where participants could be systematically grouped in relation to independent swearing memory variables (e.g., type of experience, felt emotions, perceived outcomes) for the purpose of comparative testing on dependent variables such as attention, recall, autonomic effects, and hypoalgesia. In addition, ongoing experiences of swearing throughout the lifespan, as well as the individual's adult patterns of swearing (both frequency and routine type/purposes) could be investigated within this paradigm as mediating factors. Third, any research on this topic should aim to include a *wide-ranging demographic*. Much of the empirical research to date has been with higher education students. Engaging a wider participant base would allow access to a broader range of biographical backgrounds together with associated social, cultural, linguistic, interactional and parenting norms. This aspect could also accommodate multilingual-based research on swearing, not only as a comparative issue, in its own right, but also to provide a richer diversity of data on swearing experiences, norms and practices, as well as the relationship between these and swearing potencies/effects.

Data availability

No data was used for the research described in the article.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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