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Why are males inclined to use strong swear words more than females? An evolutionary explanation based on male intergroup aggressiveness

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ABSTRACT

The research on sex differences in terms of the use of strong swear words show that males have the inclination to utter strong swear words and to display aggressive actions more than females. Correspondingly, recent discoveries stress that females have larger volumes of orbital frontal cortex that modulates anger and aggressiveness created by the amygdala which might be related to sex differences in the use of strong swear words. Based on these findings, this study explores what kind of environmental and social pressures might have fashioned strongly swearing aggressive males during the course of human evolutionary history and examines the evolution of swearing by discussing the possible factors that might have prompted its emergence in our evolutionary background.

1. Introduction

Differences in the ways that males and females use language have been of a major concern for researchers. One topic that has withdrawn considerable attention is *swearing*. Swearing is often described as a linguistic activity that involves *the use of taboo words* (Stapleton, 2010). "Taboos in English are placed on sexual references (blow job, cunt) and on those that are considered profane or blasphemous (goddamn, Jesus Christ). Taboos extend to scatological references and disgusting objects (shit, crap, douche bag); some animal names (bitch, pig, ass); substandard vulgar terms (fart face, on the rag); and offensive slang (cluster fuck, tit run) (Jay, 2009, p.154)." According to Hughes (1991, p.03) "swearing draws upon such powerful and incongruous resonators as religion, sex, madness, excretion and nationality, encompassing an extraordinary variety of attitudes". The term swearing is used generally to bring up several categories of offensive speech: name calling, insulting, profanity, slang, vulgarity, obscenity, epithets, slurs, and scatology (Jay, 1996). Andersson and Trudgill (2007) define swearing as language use in which the expression: (i) refers to something taboo or stigmatized in the swearer's culture, (ii) is not intended to be interpreted literally, (iii) can be used to express strong emotions or attitudes.

Humans are thought to have been using swear words since the emergence of language (Vingerhoets et al., 2013) and it is considered to be a fundamental and ubiquitous characteristic of human communication (Jay, 2009). Montagu (1967, p. 5) claims that swearing is "as old as man and coeval with language". Similarly, by providing examples from the ancient hieroglyphic inscriptions dating back to 1000BC, Ljung (2011) argues that swearing was an item of communication during the

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ancient times. “Swearing has been documented in the lexica of many social groups: soldiers, police, high school and college students, drug users, athletes, laborers, juvenile delinquents, psychiatric patients, and prisoners (Jay, 2009, p: 154).” Recorded conversations show that about 80–90 spoken words each day – 0.5% to 0.7% of all words – are swear words (Jay, 2009).

Swearing includes so many disparate forms that some broad distinctions need to be made at the outset. We *swear by*, we *swear that* (something is so), we *swear to* (do something), we *swear at* (somebody or something), and sometimes we swear simply out of exasperation (Hughes, 1991). Of these broad distinctions, this paper primarily focuses on *swearing at somebody* which was considered by Hughes (1991) as the most dominant mode of swearing. Wierzbicka (1987) describes swearing at somebody as a *deliberate bad act* that is designed for expressing emotions or a particular meaning and a particular attitude towards some person, event or object. Swearing at someone is the utterance of emotionally powerful, offensive words *(e.g., fuck)* or emotionally harmful expressions *(e.g., kiss my ass, piss off, up yours)* that permits a speaker to express strong emotions or to produce an emotional impact on a listener (Jay, 2000). Jay and Janschewitz (2008) argue that the primary drive for swearing at someone strongly is to express emotions, especially anger and frustration. Word-scaling and autonomic-arousal studies have shown that swear words that human beings say to others can be mildly offensive *(e.g., damn, fart)* or strongly offensive *(e.g., cunt, nigger, fuck)* (Janschewitz, 2008; Jay, 1992). Although offensiveness of swear words depends on contextual variables, the primary purpose of strong swear words is to produce an undesired emotional influence on a listener while mild swear words do not intentionally aim to hurt the listener. Olweus (1994, p. 09) states that using strong swear words at someone is a *negative action* and “a negative action is when someone intentionally inflicts, or attempts to inflict, injury or discomfort upon another”. In this sense, the intentionality of swearing at someone strongly overlaps with *aggression* or *aggressive behavior* which is defined as “any behavior directed toward another individual that is carried out with the proximate (immediate) intent to cause harm (Anderson and Bushman, 2002, p.28).” Human aggression can be both verbal and physical. Thus, the intention to cause hurt someone is the main motivation for displaying aggressive behavior and using strong swear words at someone.

Despite the commonality of swearing in everyday social interaction, in most cultures and societies using strong swear words at someone is considered as an *offensive insulting act* and, thus, its use in social interaction is often despised. Even laws against swearing in public still exist in some states and, informally, fines may be incurred in social settings (Van Lancker and Cummings, 1999). Throughout human history, the use of swear words was seen as degrading and offensive and swearing was sometimes punished by custody, excising of the tongue, or even the death penalty (Pinker, 2007).

The research on sex differences in terms of the use of swear words show that males are inclined to use strong swear words more than females (Bailey and Timm, 1976; Mehl and Pennebaker, 2003; Mulac and Lundell, 1986; Jay, 1996). Correspondingly, the frequency of swearing in public is higher in males than females (McEnery, 2005; Thelwall, 2008). Men possess a larger lexicon for strong swear words than females. For example, in a study, Foote and Woodward (1972) requested undergraduate students to produce as many “dirty, vulgar, foul or generally objectionable words or phrases” as they could think of. Their study results display that men out-produced women by a factor-of 50%. Other studies show that while women use milder swearing more, men tend to use strong swear words more often than women (Bailey and Timm, 1976; McEnery, 2005). However, men usually prefer to swear in male groups and use less swear words when they are around females (Bayard and Krishnayya, 2001; Coates, 1986). Swearing is perceived as a sign of manliness (Benwell, 2001). The occupational groups in which swearing is regular, seem to be professions that are mainly occupied by men (Johnson and Lewis, 2010). Men are more likely than women to swear when frustrated or angry, while women are more likely than men to view swearing in anger as loss of control and realize that swearing might jeopardize their relationships with others (Bird and Harris, 1990). McEnery and Xiao (2003) looked at the contrast between the gendered uses of all forms of “fuck” in the British National Corpus. Their study results show that men use the word “fuck” and its derivates twice as much as women. In a study Selnow (1985) gave a questionnaire to 135 undergraduate students. He wanted to see if there was a measurable difference in the use of swearing men and women reported. Then, he wanted to examine the contexts in which men and women believed it was appropriate to use swearing. Female respondents generally reported using swearing to a lesser degree than men. Female respondents also commonly believed that in most of the contexts stated in the questionnaire, the use of swearing was less proper than males did. De Klerk (1991, 1992) also found that males displayed a greater tolerance for the use of swear words than females. Research shows that the frequency and strength of swearing for both sexes depend on factors, such as social networks, social status, age, and education (Hughes, 1992; De Klerk, 1991, Stapleton, 2003). However, the studies in general report that males have the tendency to use strong swear words more than females (McEnery, 2005).

Since swearing at someone is considered as an aggressive behavior that is connected with the expression of emotions (Jay and Janschewitz, 2008), the male predisposition to utter strong swear words more than females underscores that males are generally more aggressive than females and male brains may have the propensity to create more aggressive behavior than female brains. Supporting this hypothesis experimental evidence suggests that compared to females, male behavior and psychology are more inclined to aggression (Tooby and Cosmides, 1988; Wrangham and Peterson, 1996; Brown, 1991; Goldstein, 2003; McDonald et al., 2012; Navarrete et al., 2010). Recent research on neuroanatomy of human brain shows male aggressiveness as an outcome of men having significantly smaller volume of orbital frontal cortex than women and women harbor a substantially larger orbitofrontal-to-amygdala ratio than men. Gur et al. (2002) performed MRI scans on 57 men and 59 women between the ages of 18 and 49. The researchers measured the volume of the amygdala, hippocampus, and other limbic areas connected with emotional stimulation, as compared to the volume of orbital frontal brain regions that apply regulation over emotional responses. Their study results show that women had significantly larger orbital frontal cortex volume than men. In another study with 117 healthy right-handed adults (58 female), age 18–40 years, Welborn et al. (2009)

found that women have larger right lateral orbitofrontal cortex. MRI images display reduced hemispheric brain volumes, specifically in the frontal and temporal regions of the orbital frontal cortext, in men more so than women. In a study measuring the gray matter volume in different brain regions, Raine et al. (2011) found that male participants as a whole had reduced orbitofrontal and middle frontal gray volume when compared with females. Goldstein et al. (2005) measured sex differences in prefrontal cortical brain activity during fMRI of auditory verbal working memory and found that women were more likely than men to show significantly greater activations in orbitofrontal cortex which is associated with inhibitory functions. Reduced frontal volume has been associated with greater tendency toward psychopathy in men (Fuster, 1996). Focal orbitofrontal injury is specifically associated with increased aggression (Brower and Price, 2001). Since orbital frontal cortex modulates anger generated by amygdala, these findings explain sex differences in emotional behavior, particularly aggression which is the underlying factor that causes males to use foul speech more than females. What that suggests is that when anger and aggression are stimulated, women are better prepared neurologically to step on the brakes than men.

These different neural pathways devoted to emotional modulation relate to behavioral evidence for sex differences in emotion processing (Campanella et al., 2004). If women and men in our ancestral societies had been exposed to the same environmental and social pressure, we would not expect to witness these types of sexual dimorphism. As Joseph (2000, pp. 36–37) notes "rather than purely a product of societal, political, or parental pressures, the amplification of these sex differences, like other cognitive capabilities such as math, are also neurologically based and a product of our evolutionary heritage. This includes the differential environmental pressures exerted on males and females and their descendants over the course of the last million years, possibly reaching their culmination with the close of the Upper Paleolithic." The male propensity to be aggressive and use strong swear words more than females highlight the possibility of different environmental and social pressures that our male and female ancestors might have been exposed to in our evolutionary history.

Considering these findings, this research investigates what kind of environmental and social pressures fashioned strongly swearing aggressive males during the course of human history and examines the evolution of swearing at somebody by referring to the possible factors that triggered its emergence in our evolutionary lineage.

2. The neurobiology of swearing: is it related to emotions?

Research on neurobiology of swearing highlights a relationship between the limbic system and swearing. For instance, Kensinger and Corkin (2004) found enhanced amygdala activity during the initial processing of taboo words, and is associated with enhanced attention and superior memory for taboo words. Amygdala has an important role in controlling and organizing emotions. As research has shown neurological problems in or near the amygdala caused the patients to display extreme emotional responses or none at all (Adolphs et al., 1999). Particularly, the direct stimulation of the amygdala in human patients can bring both positive and negative emotions, including feelings of fear, sadness, and happiness (Lanteaume et al., 2007). Jay and Janschewitz (2008, p: 270) note that "swearing is a product of language processing areas in the left frontal and temporal lobes as well as emotional processing areas in the right cerebral hemisphere and subcortical structures, most notably the amygdala." Pinker (2007) points to role of amygdala in the production of cathartic swearing. He stresses that the sudden activation of the "Rage circuit," which runs from a part of the amygdala down through the hypothalamus and subsequently in the gray matter of the midbrain when confronted with pain or anger may produce cathartic swearing. Vingerhoets et al. (2013, p: 290) state that "more automatic or impulsive forms of swearing result from activity in the limbic system and basal ganglia of the brain. When these structures are damaged, this can lead to coprolalia, a condition in which a person frequently and uncontrollably utters swear words." This condition is also a symptom in some patients with Tourette's disease, in which swearing manifests as an uncontrollable tic, along with other sudden, repetitive, non-rhythmic movements or utterances (Van Lancker and Cummings, 1999). These tics are demonstrated as involuntary outbursts of swearing or other inappropriate language. Another important finding in relation to swearing is its relationship with aphasia. Research stresses that although people with aphasia may have severely impaired speech, they frequently use swear words with greater fluency and regularity than other words. As Van Lancker and Cummings (1999, p: 84) note it "swearing is frequently one of a small set of speech functions- "automatic speech"- selectively preserved in the severely aphasic patient. Swearwords and phrases are produced with normal articulation and prosody, in stark contrast to the remaining speech and language disability." This finding shows that swearing does appear to have a particular place in the brain other than the areas that control language production. The production of swear words by aphasia patients underscore that swearing is more about expressing an emotional state than uttering an actual linguistic idea.

3. Are males more aggressive than females?

The role of the limbic system in producing swear words and the male propensity to utter strong swear words more than females imply that males are more aggressive than females and they use swearing at someone as a means to express aggressive emotions. One important question that needs to be asked at this point is what kind of evolutionary pressures might have triggered male aggressiveness?

Recent research about the origins of aggression shows that throughout our evolutionary history males have typically been the agents and victims of aggressive violence (Tooby and Cosmides, 1988; Goldstein, 2003; McDonald et al., 2012). However, this aggressive violence has generally been in the form of intergroup violence. Studies on intergroup aggression have provided solid findings that show intergroup conflict and aggression have been common across human societies throughout our

evolutionary history (McDonald et al., 2012; Pinker, 2011; Hagen, 2008; Bowles, 2012; Walker, 2001; Lambert, 1997). As McDonald et al. (2012, p. 670) put it "conflicts among human groups have occurred throughout our modern history and range from large-scale conflicts, such as wars between countries, terrorism, racial and ethnic discrimination, and conflict among political parties, to relatively small-scale conflicts involving competition, antagonism and aggression among rival sport teams, gangs and high school cliques." Moreover, research on Paleolithic hunter-gatherer societies also confirm that hunter–gatherers also made war (Ember, 1978; Lambert, 1994, 1997; Walker, 2001; Bowles, 2012; Wrangham, 1987) which means that intergroup violence has always been a common activity in human life. The phylogenetic investigation of intergroup encounters in chimpanzees, bonobos, and gorillas also makes it very likely that our common ancestor also shared a similar disposition to display aggressive intergroup relations (Wrangham, 1987; Sherrow, 2012; Pusey, 2001).

Current insights and discoveries on the roots and sex-related expression of intergroup aggression show that men are by far the most likely committers and victims of intergroup aggression, now and in the past (Wrangham and Peterson, 1996; Tooby and Cosmides, 1988; Goldstein, 2003; McDonald et al., 2012; Van Vugt et al., 2007; Van Vugt and Park, 2009). "Where there is intergroup conflict characterized by violence, injury or death, we find that such acts of aggression are perpetuated almost exclusively by men" (McDonald et al., 2012, p. 670). In all cultures examined up to the present time, men are overwhelmingly more often the killers and their victims are characteristically other males (Buss, 1997). These arguments are also supported by experimental research. For instance, males use more abusive and animalistic exclamations in order to brutalize out-group members than females do (Van Vugt and Park, 2009). Males exhibit intimidating actions only when the out-group is composed of men (Navarrete et al., 2010). Men also display a predisposition to use danger-relevant stereotypes about out-groups members when faced with ambiguously threatening circumstances (Schaller et al., 2003). Men were found to show more in-group dedication by sticking with the group though it was more economically attractive to leave (Van Vugt et al., 2008). McDermott et al. (2007) investigated the impact of testosterone on aggression in a crisis simulation game. Their study results show that men are much more likely to engage in aggressive action than women. Males provided more intragroup assistance if their group was challenging other groups than if there was no intergroup competition (Van Vugt et al., 2007). " Men tend to be more discriminating against out-groups than do women, but also suggests that intergroup bias is primarily directed at men, particularly when it is framed as a competitive enterprise" (McDonald et al., 2012, p. 672).

The phylogenetic analysis of intergroup interactions in chimpanzees, bonobos, and gorillas also makes it extremely likely that our mutual ancestor similarly shared an analogous tendency to show hostile intergroup affairs (Wrangham, 1987). Comparable to humans, the principal characters who participate in brutal intergroup encounters are males in chimpanzee, bonobo, and gorilla societies. Pusey (2001, p. 34) states that "given the rarity of male philopatry and male cooperation in intergroup hostility among animals, it is striking that these patterns occur in our closest relatives, chimpanzees, and to some extent in bonobos and gorillas. It is likely, therefore, that our common ancestor also shared this pattern". The fossil record shows that early hominid males (Australopithecines) were physically 50–100% larger than early hominid females (Geary, 2000). Furthermore, "the predecessor of Australopithecus afarensis, that is, Australopithecus anamensis, showed the same sexual dimorphism, further supporting the position that there has been a long – at least 4,000,000 years – evolutionary history of physical male– male competition in hominids (Geary, 2000, p. 59)". The legitimately low degree of sexual dimorphism for body dimensions among modern Homo sapiens (males are only about 15% larger than females, on average) shows that early hominid males were even more ferocious (Plavcan and van Schaik, 1997).

Historically males and females have been under different selection pressures which are reflected by biochemical and behavioral differences between the sexes. The aggressive fight-or-flight reaction is more dominant in men, while women predominantly adopt a less aggressive tend-and-befriend response (Lee and Harley, 2012). For males the risk may be outweighed by the possible gains of resources, status and access to fertile females. However, for females the costs of aggressive behavior exceed the benefits. Lower levels of aggression in the female reflect an adaptive behavior motivated by the importance of her survival. The mother's presence is more critical to the survival of offspring than the father's (Campbell, 1999). If a woman wants her children to survive she must be concerned with her own survival.

Human males joined in aggressive coalitions as it has several adaptive benefits. As Buss (1997, p. 612) notes:

> "In species in which females invest more heavily in offspring than males, females become the valuable limiting resource on reproduction for males. Males become constrained in their reproduction not so much by their ability to survive, but by their ability to gain sexual access to the high-investing females. The sex difference in minimum obligatory parental investment (e.g., mammalian females bear the burdens of internal fertilization, placentation, and gestation) means that males can sire more offspring than females. Stated differently, the ceiling on reproduction is much higher for males than for females. This difference leads to differences in the variances in reproduction between the sexes. The differences between the haves and have-nots, therefore, become greater for males than for females."

Compared to females, males invest little in gestation and nurturing activities. Once a male has effectively bred with one female, he has the choice of rapidly moving on to successfully bred with another. "The sex that invests the most in offspring (usually females) will be more discriminating when it comes to mating. The sex that invests the least (usually males) will tend to favor quantity over quality of mates and will compete more intensely; that is, males will compete with other males to be chosen. Often accompanying this male–male competition will be intense aggression and risk taking (Gottschalk and Ellis, 2009, p. 65)." McDonald et al. (2012) discuss the evolutionary models of sexual selection, parental investment, and group selection to enlighten assistances of joining aggressive coalitions, predominantly for human males. Compared with women, men are expected to show intergroup rivalry because for them the reproductive incomes sometimes overshadow the costs

(Buss, 1999). Even amongst animals aggression is not indiscriminate and fighting generally ends or weakens at the end of the mating season. This indicates that access to females is a greater motivating factor in male aggression. McDonald et al. (2012) hypothesize that men might have formed coalitions with other men to extract reproductive resources from members of other groups. Thus, intergroup rivalries might have involved challenges for sexual contact, foraging grounds, and sleeping spots. From an evolutionary perspective humans are most likely to survive if they have access to resources; if they can defend their resources and protect their families; and if they can attract or gain access to mates. Aggressive male behavior seems to have evolved to support the human race in achieving all of these primary goals.

As males display more aggressive behaviors than females and as a related activity as they use more strong swear words than females, the inter-individual and intra-individual reasons that trigger male swearing needs to be examined.

4. Inter-individual and intra-individual reasons

Swearing is more likely to occur when the swearer feels a high level of stress (Montagu, 1967). Thus, swearing is considered as a cathartic action that frees us of the feelings of anger or frustration (Jay, 2009). When an individual encounters a threat or problem that s/he is facing, s/h may believe that abusive or aggressive speech will greatly enhance his/her ability to control that threat or problem. "The catharsis effect may also explain why swearing might be an alternative for physical aggression. By letting off steam through swearing, feelings of anger and frustration can be reduced, resulting in a decreased probability of overt, physical aggression" (Vingerhoets et al. 2013, pp.293). On the other hand, swearing helps to relief pain. For instance, Stephens et al. (2009) found that people who swear are able to hold their hands in ice-water for twice as long.

Swearing at someone also has a communicative function. If someone swears, the environment is warned of the emotional state of the swearing person. It can thus serve as an alarm signal of potential threat for others, just like any other sign of anger (Vingerhoets et al., 2013.) When an individual feels threatened by someone or something s/he uses aggressive swear words to threaten and dominate things in hopes that the attack will stop. Swearing at someone is just verbal violence in place of fists. If someone backs down after verbal retaliation, then in the swearer's mind s/he has just successfully protected himself/herself with his/her mouth. Actually, both verbal and physical aggressions are often accompanied by swearing (Rassin and Muris, 2005). Moreover, swearing may cause others to stop their continuing activities. Swearing can give people a greater sense of power and control over an undesired condition. By swearing humans show that they are not inactive victims but empowered to respond and battle. This can boost self-confidence and self-esteem, and also provide the motivation for further remedial action to be taken. In the short-term, swearing can cause fear and hostility in others.

When the evolution of swearing is considered it is possible that swearing out of annoyance or frustration was as a primitive act of speech, comparable to the growling of animals which has been stated by Patrick (1901) long time ago. As Vingerhoets et al. (2013, pp. 290) put it "the growling of an animal communicates its emotional state, so other animals will be deterred from further action, and the resulting growling animal's stress level will subsequently be reduced. Relatedly, growling will also contribute to the inhibition of physical aggression towards other animals. In fact, growling can be regarded as an alternative behavior to an immediate attack." These functions of growling overlap the intra-individual and inter-individual functions of swearing. It is possible that, before human beings invented language, they were using growling for several intra-individual and inter-individual reasons during aggressive encounters. After the invention of language, the action of growling might have been replaced by the use of strong swear words that highlight the intention to cause harm. Just as during the utterance of swear words in humans, the limbic system has also been found to be involved with animal calls and animal growling. For example, stimulation of several parts of the limbic system in macaques and squirrel monkeys tempts the animal to produce various emotionally aggressive vocalizations including growling (Robinson, 1967; Jurgens and Ploog, 1970). The overlap between the brain area that stimulates growling and swearing strongly imply that aggressive growling was a primitive from of swearing before language was invented.

5. Discussion and conclusion

Research on the use of strong swear words stresses that males are inclined to utter them more than females. This finding essentially implies that males are generally more aggressive than females and male brains do not have the potential to cope aggressive emotions and outbursts as much as female brains do. Evolutionary explanations and theories of sexual selection, parental investment time, and group selection explain why males display such an inclination and females refrain from it.

Based on these findings and explanations it can be argued that males engaged in aggressive intergroup encounters in order to gain sexual access to productive females and other resources in our evolutionary history. These encounters even took place before human beings invented language as a cultural artifact. Although, it is not possible to give an exact date that determines the time when the first humans developed language, seashell necklaces, engraved pigment chunks and other signs of symbolic cultural behavior date between 160,000 and 80,000 years ago in Africa, a period when languages like those today must have first been spoken. Thus, it is anticipated that human beings have been using language as a cultural artifact for at least the last 80.000 years. Early hominids (Australopithecus anemensis and afarenis) were also 50% to 100% larger than females (Geary, 2000). However, the fairly high degree of sexual dimorphism for body size among modern Homo sapiens (males are only about 15% larger than females, on average) indicates that early hominid males were violent and they engaged in aggressive behaviors more than female group members (Plavcan and van Schaik, 1997). Considering this, it is possible to argue that male aggressiveness and the desire to utter strong swear words (most probably displayed in the form of aggressive

growling) precede language. On the other hand, since females were the ones who bear the burdens of internal fertilization, placentation, and gestation, it would be risky for them to display intergroup aggressiveness as intergroup encounters could result in death. Thus, females in our ancestral societies probably adopted a less aggressive tend-and-befriend response (Lee and Harley, 2012), as the costs of aggressive behavior exceeded the benefits and the mother's presence was more critical to the survival of offspring than the father's (Campbell, 1999). Consequently the environmental pressure of being less aggressive for the sake of parental investment caused female brains to have a larger orbital frontal cortex that modulates anger generated by amygdala. In contrast, the male brain never required a larger orbital frontal cortex in human evolutionary history as intergroup aggressiveness leaded males to possible gains of resources, status, and access to fertile females. Research shows that different sex roles in the environment had major effects on brain biology (Gur et al., 2000; Jordan et al., 2002). In our evolutionary history, for males, the costs of aggressive behavior did not exceed the benefits. Hence, the male brain did not feel any environmental push to alter its structure and develop a larger orbital frontal cortex to control anger and aggressiveness. The linguistic consequence of this situation was aggressive males who had an inclination to use strong swear words more than females.

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