



Hashtagging for Health Promotion: Constructing Meaning as an #AntibioticGuardian

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1. INTRODUCTION

The development of Social Networking Sites (SNSs) has been one of the most groundbreaking phenomena in the field of computer-mediated communication (CMC) over the past two decades. SNSs are now offering unprecedented opportunities to produce and share user-generated content (UGC), and negotiate meaning through social tagging practices. User-generated tagging, or social tagging, refers to the practice of generating electronic tags or keywords to locate, organise and re-find digital resources (findability) (Morville 2005; Smith 2008). Tag choices thus appear to reflect the specific meanings that individual users make of a resource (Cress *et al.* 2013). However, a new tagging culture has developed in Twitter, one of the most popular microblogging sites, which moves beyond these more traditional tagging practices. Rather than using it as “a tool for recall”, “tagging has emerged as a method for filtering and promoting content in Twitter” (Huang *et al.* 2010: 173). This involves “placing a hash symbol (#) in front of short strings, called *hashtags*, on [users’] posted messages, called *tweets*” (ibid.). This peculiarity may be considered as part of the new practices of “*user adaptations*” which are emerging “to circumvent the constraints of Web 2.0 environments” (Herring *et al.* 2013: 14; original emphasis). Hence, the resulting discursive (re)evolution does not simply spring from the “notably different



communicative dynamics" (Sergeant and Tagg 2014: 2) offered by Twitter, but it is rather driven by the constraints imposed on the ways UGC can be processed and produced. As a result, the 140-character limitation of Twitter has triggered a range of innovative "user-driven processes" through which the #hashtag symbol is being appropriated beyond its original purpose of "collect[ing] related messages in an easily accessible space" (Bruns 2012: 4). Thus, "the linguistic innovation seen in hashtagging is both a product of the reduced affordances of the character-constrained mode" and part of the process of creating "new kinds of meaning making with language" (Zappavigna 2015: 16).

In this light, the present paper examines one peculiar kind of meaning making which takes place in the emerging culture of public health hashtagging on Twitter. While ordinary conversational exchanges have been the main object of study in the fields of CMC, linguistics and discourse analysis for some time now, the emerging practice of "organising *ad hoc* discussion communities" (Bruns and Burgess 2015: 14) has recently started to arouse some interest in the use of the hashtag. So far, however, research on this tagging practice has been restricted to "the use of Twitter to coordinate political discussions, or crisis communication" (*ibid.*, 13). Thus, there is still a lack of linguistic research on the unique kind of meaning making allowed by hashtagging practices in discipline-specific communities created for special purposes. A case in point is that of public health communities, which are organised in Twitter to promote health communication campaigns (Shi *et al.* 2016). The functional uses of the hashtag within these discussion communities have so far been largely under-researched (Donelle and Booth 2012), although they are gaining momentum.

Accordingly, the present paper attempts to make a contribution to filling this void by investigating how the hashtag may (re)shape meanings in public health campaigns. The peculiarity of these campaigns is determined by the simultaneous combination of the character-constrained mode of Twitter and the adoption of the conventional "organized set of communication activities" (Atkin and Rice 2012: 3), which ensures the effectiveness of health promotion. These activities are, in fact, considered key to "the forms messages will take, if not their content" (Rogers and Storey 1987: 821), and include four types: *increasing awareness and knowledge, providing cues for action, demonstrating simple skills, and changing and/or reinforcing attitudes and behaviours*.

More specifically, the study aims at analysing the lexicogrammatical realisations (Halliday and Matthiessen 2004) and evaluative language (Thompson and Hunston 2000) mediated through the hashtag, and the predominant discourse functions it serves in each of the communication activities framing public health campaigns. It thus expands on previous research, which has mostly focused on the micro-features of the hashtag limitedly to popular conversational exchanges by looking at both the micro- and macro-levels of hashtagged discourse in domain-specific exchanges. For this purpose, the research is based on the discourse analysis of a corpus of sample



tweets taken from #AntibioticGuardian as an empirical case of public health campaigns disseminated through the medium of Twitter.¹

Furthermore, the investigation draws on key concepts of hashtagging from previous studies. For instance, Cunha *et al.* (2011) show that hashtags with a shorter length and without the underscore symbol (_-hashtags) rank higher in popularity, and can thus be suitably used for promotional purposes. Page (2012), instead, examines the hashtag as a means of self-branding, distinguishing its meaning according to topic tags “in the manner of folksonomic tagging”,² and tags “expressing an evaluative sentiment” (p. 187). Wikström (2014a: 105) points out that “hashtags are often appropriated by users of Twitter for a variety of expressive purposes, such as marking emphasis, or generally as an alternative to other typographic devices common in CMC”. Wikström (2014b) further underlines how hashtags serve a wide range of communicative functions, including “meta-comment tags”, which “may be understood in terms of hedging, disclaiming and managing face”; “parenthetical explanations” that “provide background information which is sometimes crucial to clarifying utterance force, but other times supplemental”; “emotive and emphatic tags”, which “change the illocutionary force of utterances” in a similar way to “non-verbal cues in face-to-face conversation” (p. 149). Zappavigna (2015) distinguishes hashtags from traditional metadata since they can construe “experiential” meaning through topic metatags, “textual” meaning with the # symbol acting as a form of punctuation at the typographic level, and “interpersonal” meaning through evaluative metacomments. Evans (2016) examines an innovative appropriation of the # symbol within a single tweet, where it can function as either an evaluative or epistemic stance marker of tweet content. Bourlai *et al.* (2016) introduce structural criteria, including the hashtag’s position, length, grammatical function, presence of repeated characters, number of words, as well as the presence of acronyms or abbreviations to identify four pragmatic types of hashtags, namely topical, evaluative, ambifunctional, and extracontextual.

On the whole, the investigation attempts to shed light on how health promotional discourse may be meaningfully mediated through the use of the simple #hashtag symbol, and thus may inform health professionals about this new communicative practice. The research may also offer insights into the ongoing process of appropriation of the language of Twitter, which seems to be “debanalising Twitter” as “a source of pointless babble” (Rogers 2014: xxi)³.

¹ It is worth noting that the twitter account #AntibioticGuardian as a digital resource of a ‘public’ health campaign makes use of the # symbol to increase findability, rather than the @ symbol which would simply tag acquaintances into posts and/or notify them about these.

² Vander Wal coined the term “folksonomy” to indicate “the result of personal free tagging of information and objects (anything with a URL) for one’s own retrieval”.
<vanderwal.net/folksonomy.html> (2 October 2017).

³ This ongoing process is also reflected in the change made in 2009 to Twitter’s initial prompting question: “What are you doing?” isn’t the right question anymore - starting today, we’ve shortened it by two characters. Twitter now asks, ‘What’s happening?’

<https://blog.twitter.com/official/en_us/a/2009/whats-happening.html> (19 October 2017).



2. PUBLIC HEALTH CAMPAIGNS: UGC IN COMMUNICATION ACTIVITIES

Public health campaigns can be considered as “purposive attempts to inform or influence behaviors in large audiences [...] using an organized set of communication activities [...] to produce noncommercial benefits to individuals and society” (Atkin and Rice 2012: 3). While these campaigns can feature “an array of mediated messages in multiple channels” (ibid.), the WHO (2013: 141) advocates “a new and expanding role for the social media in articulating and communicating health messages and perceptions”. Public health interventions have, in fact, started to harness the potentials of Twitter, although they still need to rely on these activities. On the one hand, UGC in Twitter can thus be creatively designed to include different multimodal forms of health messages; on the other, content needs to be organised according to the conventional communication activities, which have been used over the past five decades to ensure the effectiveness of campaigns. These activities refer to the following four types:

1. *increasing awareness and knowledge*: drawing on the Health Belief Model (HBM), this communication activity is designed to bring about changes in health knowledge and beliefs. According to the model, arousing a certain level of anxiety may contribute to motivating changes in people’s health attitudes and behaviours, and *risk communication* is thus seen as an important component. In the *informative* type of discourse mediating this activity, the hashtag may be appropriated to construct meanings of awareness, knowledge and/or risk;
2. *providing cues for action*: this activity draws on the same construct found in the HBM, whereby cues may prompt *community-based* or *individual* regulatory actions. In the *regulatory* type of discourse mainly mediating this activity, the hashtag may have a role to play in creating meanings of action, regulation, and commitment. Cues may, in fact, encourage more active forms of commitment, like public pledging, which is considered an “effective health promotion strategy” (Ludovici-Connolly 2010: 159);
3. *demonstrating simple skills*: by referring to traditional learning theories, which advocate the importance of improving people’s health literacy, this activity is shaped through instructional discourse aimed at equipping people with health knowledge and competency. Here, the hashtag may possibly be used to point to any practical learning activity, which aims at facilitating people’s decision-making choices at the individual or community level;
4. *changing and reinforcing attitudes*: this activity is influenced by the concept of *direct modelling* borrowed from Social Cognitive Theory. It acknowledges positive health-oriented behaviours of people introduced as role models. This can help influence other people’s attitudes and behaviours and determine changes. The activity thus relies on *social* discourse in which the hashtag may potentially legitimate and publicize role models of positive behaviours.



Together these four communication activities blend informative, regulatory, instructional and social types of discourse in different ways that all strive, however, to strengthen the effectiveness of public health campaigns. While these activities/discourses are thus part of an integrated process of constructing meaning, they are treated in this study as separate components. This will allow a more fine-grained analysis of the distinct meanings that the hashtag is capable of constructing, and of its contribution in shaping significant UGC patterns.

3. METHODOLOGY

A case study approach is adopted to frame the research methodologically as it supports the use of a small specialised corpus of tweets from a single public health campaign on Twitter. This approach appears suitable to gain a deeper understanding of the complex phenomenon of public health campaigns in digital settings by narrowing it down into manageable research questions. To this end, the two main research questions addressed by the study are the following:

RQ1 Which are the main lexicogrammatical and evaluative uses made of the hashtag for each of the four types of communication activities which conventionally frame effective public health campaigns?

RQ2 Which predominant discourse functions do these hashtags serve, also in shaping significant UGC patterns?

3.1. *The Corpus*

The data for this study consists of 2,438 tweets, which were collected from #AntibioticGuardian in the 12-month period between October 2016-2017. Through this Twitter account, Public Health England is currently conducting a health campaign to reduce Antimicrobial Resistance (AMR), which is considered as a major global health issue.⁴ #AntibioticGuardian can thus be broadly seen as one type of “discourse which attempts to make the world a better place” (Martin 2008: 112). As Matthiessen (2012: 445) notes, these discourses “can serve as positive models for us to follow in undertaking constructive socio-semiotic change or at least to learn from [...]”. #AntibioticGuardian is endowed with this positive feature since it essentially operates as an online pledge system for healthcare professionals and the public to become Antibiotic Guardians.

⁴ According to The World Health Organization, AMR “happens when microorganisms (such as bacteria, fungi, viruses, and parasites) change when they are exposed to antimicrobial drugs [...]. As a result, the medicines become ineffective and infections persist in the body, increasing the risk of spread to others”, <<http://www.who.int/mediacentre/factsheets/fs194/en/>> (19 October 2017).



3.2. Method of Analysis

The peculiarity of the corpus suggests taking a different methodological approach to discourse: rather than “deconstructing what is wrong with the world”, focus should also be placed on “how to put things right” (Martin *ibid.*). In underlining the need for Positive Discourse Analysis as a complementary approach to Critical Discourse Analysis, Martin (2004: 184) argues that “the lack of positive discourse analysis (PDA) cripples our understanding of how change happens, for the better, across a range of sites [...]”. In this respect, the communication activities framing the #AntibioticGuardian public health campaign can be seen as one of these sites since they attempt to drive changes in the current misuse and overuse of antibiotics, which continue to contribute to the AMR phenomenon. Accordingly, PDA is carried out in the present study as a suitable “special purpose form of discourse analysis”, which “can involve any stratal features in the analysis of a given text in its context and in terms of the content plane (lexicogrammar and semantics) and context” (Matthiessen *ibid.*).

The collected raw data were filtered, and non-English language tweets together with those without hashtags were discarded. The resulting 1,022 tweets with hashtags (41.9% of all the tweets in the corpus) were filtered further to sort out duplicate tweets ($N=284$; 27.8%), which were treated as noise. The refined dataset is thus made up of 738 tweets, and a total number of 1,816 hashtags as multiple hashtags were frequently used in single tweets ($N=699$; 94.7%).

At the micro-discursive level, hashtags were coded to seek their lexicogrammatical realisations and meanings by introducing three dependent variables:

1. *word form*: single vs. compound (e.g. *imagine if #antibiotics fail to clear your child's infection* vs. *#StopSuperbugs*); social media vs. scientific abbreviations (e.g. *OMG that is too much*; *@IPS_Infection #antibioticguardian* vs. *#AMR*);
2. *syntactic position*: infix, prefix, or suffix (cf. Tsur and Rappoport 2012);
3. *evaluative lexis*: good vs. bad (e.g. *to improve use of #antibiotics we need good regulation*); important vs. unimportant (e.g. *this is more important than a lot of people realise 😊 #AntibioticGuardian*).

In detail, the occurrence of single words was taken to be an indicator of the use of a more formal register, and their intra-sentential spacing as a typographic device employed to draw attention to specific meanings; the compounding of words was, instead, considered to signal the use of an informal register. Abbreviations were considered to be features of either social media jargon, or health jargon, given the specific use made of language in this context. Syntactic position was introduced to seek whether hashtags mostly occurred at the beginning (prefix) to shape experiential meaning, in the middle (infix) for textual meaning, or at the end (suffix) to convey evaluative meaning as found in previous studies (e.g. Zappavigna 2015). Evaluative lexis was coded by using Thompson and Hunston's (2000) *good-bad* and *importance* parameters, considered as suitable systems for coding the evaluations which were likely to be formulated in this specific kind of communication. The first parameter was



used to classify lexis which denoted evaluations of positive or negative health values. These were treated respectively as expressing desirable and undesirable health-related events or behaviours, and as contributing to constructing interactional meanings of change. The second parameter was introduced to code evaluative lexis, which “appears to play a key role in the organization of texts” (ibid., 24), and thus treated as shaping content-based meanings of change.

At the macro-level, hashtags were coded according to their *discourse functions* across *discourse types* as the main independent variable based on the four conventional communication activities underlying effective public health campaigns:

1. informative: increasing awareness and knowledge (e.g. *Shouting at me louder & louder won't change the fact that I won't prescribe antibiotics for your viral cold* #AntibioticGuardian #Resistance);
2. regulatory: providing cues for action (e.g. #Drinking more water cuts UT⁵ risk in half, sparing antibiotics?);
3. instructional: demonstrating simple skills (e.g. *simple actions save lives*. #WashYourHands #CoverCoughs #AntibioticGuardian #CleanHands #SaveLives);
4. social: changing and reinforcing attitudes (e.g. #AntimicrobialResistance and our tasteless, unnatural chickens).

Hashtags were annotated manually, and a mixed-method research design was used for data analysis at both the micro- and macro-levels of discourse. Based on these results, discourse patterns were identified and examined to gain understanding of how “socio-semiotic change” (Matthiessen 2012) was constructed to counter the AMR phenomenon.

4. RESULTS AND DISCUSSION

Results obtained from two separate datasets are reported below. The first set refers to the outcomes of the analysis based on the three dependent variables used, namely word form, syntactic position, and evaluative lexis. The second set, instead, focuses on the macro-discursive findings according to the discourse functions operated by hashtags across the four conventional types of communication activities, i.e., informative, regulatory, instructional and social. Quantitative and qualitative results are presented and discussed for each of the aforementioned parameters.

4.1 Lexicogrammatical and evaluative features of hashtags

Results from the frequency analysis of word form, syntactic position, and evaluative lexis are reported in Table 1.

⁵ urinary tract infection.



<i>Dependent Variables</i>	<i>Occurrences (%)</i>
<i>Word Form</i>	<i>N= 738 tweets</i>
single	788 (43.4%)
compound	1028 (56.6%)
scientific abbreviations	144 (61.8%)
social media abbreviations	89 (38.2%)
<i>Syntactic Position</i>	<i>N=1,816 hashtags</i>
infix	1033 (56.9%)
prefix	592 (32.6%)
suffix	191 (10.5%)
<i>Evaluative Lexis</i>	<i>N=551 lexical items</i>
good (positive)	271 (49.2%)
importance (relevance)	144 (26.1%)
bad (negative)	86 (15.6%)
unimportant (irrelevance)	50 (9.1%)

Table 1. Lexicogrammatical and evaluative features of hashtags.

As for the first parameter of *word form*, all tweets show a greater co-occurrence of the hashtag with compound words (56.6%) than with single words (43.4%). While this confirms that merging words is a typical practice dependent on the character-constrained mode of Twitter, results also record a noticeable use of single words, and consequently of intra-sentential spacing as a meaningful typographic device. The significance of this device was more closely examined by looking at the way in which multiple hashtags operated in the same tweet, where single and compound words co-occurred, as shown in Example (1):

(1) **#Calling** every practitioner and care leader - #handwashing +
#antibioticguardian + #Influenza2016 = #DutyOfCare & #ProtectAoH

The verb *calling* in Example (1) introduces an appeal, which focuses on *every practitioner and care leader* as the intended agents responsible for the health prevention practices subsequently stated. The conventional typographic practice of using white spaces between single words helps draw greater attention to these agents, and thus contributes to constructing addressee-oriented meaning. The health practices are, instead, grouped as compound words, and presented in the form of an arithmetic addition through the use of the + symbol. This semiotic modality appears to create a *positive process of change* leading to the final result marked by the = sign,



which seems to reinforce the interactional meaning developed by the use of single words and intra-sentential spacing.

The use of abbreviations is also a typical feature of Twitter language to overcome the restriction imposed by the system. However, results from the analysis mainly recorded a predominant use of scientific abbreviations (61.8%) compared to the social media ones (38.2%), which are more commonly used in other contexts, as illustrated in Example (2):

- (2) Did you know it is #IIPW? #improveIPC is #key area 1 of UK #AMR strategy

All three abbreviations (IIPW, IPC, AMR) introduced by the hashtags in Example (2) are scientific. While lay participants in #AntibioticGuardian are assumed to show an interest in the health issue of Antimicrobial Resistance, and are thus likely to easily understand AMR as its acronym, not all may know about the celebration of the International Infection Prevention Week (IIPW), and even less about the scientific approach of Infection Prevention and Control (IPC), which is introduced to prevent harm caused by infection to patients and health workers. This suggests that the health jargon used by most professional members of #AntibioticGuardian may obscure lay participants' understanding and, indeed, summon the need to develop laypeople's "health twitteracy" as advocated by Sørensen (2017).

Regarding the second parameter of *syntactic position*, results recorded a higher occurrence of the hashtag in the *infix* position (56.9%) compared to the *prefix* (32.6%), and *suffix* (10.5%) positions. As Tsur and Rappoport (2012: 648) note, "if a hashtag has more than 25% of its occurrences in one position, it is considered to fit this position role". It can therefore easily be seen how hashtags in the present samples predominantly fit the infix and prefix positions. This implies that hashtags in the infix position primarily play an important syntactic role in creating cohesive ties in the text, thus acting also as linguistic markers of interactional coherence (cf. Herring 1999), as shown in Example (3):

- (3) a. To tackle #AntimicrobialResistance we need a #OneHealth approach⁶ that integrates human, animal & environmental health
b. students earn your #AntibioticGuardian champion badge for #EAAD #WorldAntibioticAwarenessWeek.

In its infix position, the hashtag operates as a marker of exophoric reference by implicitly pointing to the global AMR context in 3(a). Here, it explicitly creates a

⁶ "One Health recognizes that the health of humans, animals and ecosystems are interconnected", <<http://www.onehealthglobal.net/what-is-one-health/>> (19 October 2017).



cohesive tie (endophoric reference) between #*AntimicrobialResistance* and #*OneHealth*, which helps construct the interactional meaning of collective engagement (*we need*). In 3(b), instead, the exophoric reference to the domain of health education is indirectly marked by the hashtag #*AntibioticGuardian*, which establishes cohesive ties with #*EAAD*⁷ and #*WorldAntibioticAwarenessWeek* to build interactional meanings of educational awareness (*students*).

In the prefix position, instead, hashtags were mostly grammaticalized through the use of present progressive verb forms for the main purpose of constructing the public's experiential knowledge of health "as a resource for real-life responses to risk and uncertainty in situations of high complexity" (Baillergeau and Duyvendak 2016: 407-408), such as that prospected by AMR, as indicated in Example (4):

- (4) #*keepantibioticsworking* by simple good hand hygiene
@cppeengland #CPPEEAAD2017

Based on Halliday and Matthiesen's (2004: 83) notion of experiential meaning, Example (4) shows how the hashtag triggers the *material* process of maintaining the effectiveness of antibiotics. It therefore involves a *transitivity* process, which is explicitly grammaticalized through the present progressive verb *working*, and implicitly suggests changing current hygienic practices where necessary. All human beings are ideally expected to engage in this material process as its *participants*; the *role* they are asked to play in it is that of practising *hand hygiene* as a preventive measure. This meaning is further strengthened through intra-sentential spacing, which is used to help draw attention to the single words *hand hygiene*, and also to their positive evaluative qualifiers (*simple, good*), which act as linguistic devices encouraging current habits or desirable changes.

In the suffix position, hashtags showed a much lower frequency (10.5%) compared to their occurrences in the infix and prefix positions. Nevertheless, it is worth noting that here they introduced evaluative comments, which were rendered through evaluative action verbs in 168 tokens out of the 191 recorded (87.9%). This lexico-grammatical category was seen to realise meaning especially when analyzed as part of the "problem-solution" pattern, which is based on "the four-part structure Situation-Problem-Solution-Evaluation" (Coulthard 1994: 8) and its variations, as illustrated in Example (5):

- (5) Everyone has a role in preventing #AMR; #*ImproveIPC*

The textual pattern above shows how the Situation depicted is a universal one of social responsibility (*everyone has a role*), while the Problem concerns AMR. The Solution offered is that of the scientific approach of Infection Prevention and Control (IPC), which is marked by the action verb *improve* as the part indicating Evaluation.

⁷ The acronym EAAD stands for European Antibiotic Awareness Day.



The textual pattern thus develops a structural link between *everyone* (Situation) and *improve* (Evaluation) so as to construct the interactional meaning of *change for the better*, which is connoted in the action verb *improve*.

As for the third and last parameter of evaluative lexis, the most frequent lexicogrammatical category employed was that of evaluative adjectives ($N=551$). These were mostly connoted with meanings of health value along the *good-bad* evaluation parameter (64.8%), as shown in Example (6):

- (6) a. This is **#good advice** on when **#antibiotics** are not needed
#AntibioticGuardian #EAAD
b. **#AMR worst threat** to global health ever #AntibioticGuardian

Positive meaning is attributed to *advice* in (6)a through the evaluative adjective *good*, thus making it an implicitly desirable practice; AMR in (6)b is, instead, connoted with extremely negative meaning rendered through the evaluative adjective *bad* in its superlative form *worst*, which suggests a high undesirability of the phenomenon. The most frequent occurrence of evaluative adjectives along the *good-bad* parameter was thus considered to be consistent with the overall mission of the health campaign in raising social awareness of desirable health practices, and of the undesirability of AMR.

On the other hand, evaluative adjectives along the *importance* parameter occurred much less frequently (35.2%). Nevertheless, they were found to play a significant role in organizing texts according to the relevance/irrelevance of health content, as shown in Example (7):

- (7)a. **#Flu jab important** 4 **#AMS** **#antimicrobiastewardship** - pledge as an
#antibioticguardian & have a #flu jab
b. To slow resistance we need to cut the **#unnecessary** use of antibiotics

In (7)a, the adjective *important* is presented as a single word both to highlight the scientific value of the *#Flu jab*, and to evaluate its relevance within the following stretch of the text. Here, it acquires meaningful value as it helps build the persuasive arguments in favour of pledging against the abuse of antibiotics, and of getting flu vaccination. In (7)b, instead, the irrelevance of antibiotics is evaluated as unnecessary only after giving implicit discursive importance to the act of reducing resistance. The position of evaluative adjectives along the importance parameter can thus be seen as providing an overt signal of the preferred interpretation of content. Relevant content is, in fact, marked as important by placing evaluative adjectives at the beginning of the text; irrelevant content is signalled as unimportant by placing them at the end.

On the whole, these results address the first research question by showing that several lexicogrammatical and evaluative features distinguish the use of the hashtag in the communication activities of the health campaign.

First, the criterion of word form reveals how meaning is shaped through the co-occurrence of single and compound words with multiple hashtags in the same tweets. Single words contribute to activating the conventional typographic device of intra-



sentential spacing. This is used to attract attention to the meanings they embed, thus signalling positive processes of change. Compound words reflect, instead, the character-constrained mode of Twitter. Their co-occurrence can further be considered as an indicator of the blending of informal and formal registers. The language of Twitter used here is thus neither completely informal as that of other social media (e.g. SMS, online chats), nor is it completely formal as the standard English language, but rather lies somewhere along this continuum.

Second, the more frequent use made of scientific abbreviations suggests that the language of Twitter is now also permeated by specialised jargon, which may create difficulties in laypeople's understanding. Nevertheless, it is a clear indication that the plain language of Twitter with its social media jargon is evolving to include specific languages with their own specialised jargons.

Third, hashtags in the predominant infix position are used to create textual cohesion, and consequently, interactional coherence that helps build meanings of collective engagement in health behavioural changes. In the prefix position, hashtags are found to construct experiential meanings of health through the grammatical category of present progressive verbal forms to indicate processes of change; in the less frequent suffix position, they use evaluative action verbs and follow the "problem-solution" pattern to construct interactional meanings of change for the better.

Lastly, the lexico-grammatical category of evaluative adjectives is recurrently used to construct interactional meanings of health value along the good-bad parameter in order to raise social awareness of desirable/undesirable health practices/events. The use of evaluative adjectives along the importance parameter, instead, shows how these reflect content-based relevance/irrelevance based on their initial/final positions, thus not only contributing to text organisation, but more importantly, to influencing health content interpretation.

4.2 Discourse functions of hashtags and UGC patterns

Results from the frequency analysis of the main discourse functions performed by hashtags are reported in Table 2, where significant findings for each discourse type are highlighted in bold.

<i>Discourse Type</i>	<i>Discourse Function</i>	<i>Occurrences (%) (1,816 hashtags)</i>
<i>Regulatory</i>	<i>Providing cues for action:</i>	932 (51.3%)
	• prompting community-based preventive actions	771 (82.7%)
	• suggesting individual self-regulatory actions	161 (17.3%)



<i>Informative</i>	<i>Increasing awareness and knowledge:</i> <ul style="list-style-type: none">• making fear appeals• disseminating health knowledge	444 (24.4%) 416 (93.7%) 28 (6.3%)
<i>Social</i>	<i>changing/reinforcing health attitudes & behaviours:</i> <ul style="list-style-type: none">• soliciting change through pledging• communicating social role models	316 (17.4%) 262 (82.9%) 54 (17.1%)
<i>Instructional</i>	<i>developing health literacy:</i> <ul style="list-style-type: none">• making scientific information easier to understand• demonstrating simple skills	124 (6.8%) 108 (87.1%) 16 (12.9%)

Table 2. Main discourse functions of hashtags per discourse type.

Results show that hashtags are used more to shape a *regulatory* type of discourse (51.3%) than informative, social and instructional ones all together (48.6%). This confirms that public health campaigns construct behavioural changes via regulatory discourses, which evolve primarily as constructive responses to priority health issues (Plastina 2017), regardless of the medium employed. The predominant use of the discourse function of prompting community-based preventive actions (82.7%) reflects, in fact, the current trend of adopting a population-based approach to health promotion, rather than the traditional individual approach, as illustrated in Example (8):

(8) @NHSflufighter, **#tips** to prevent spreading flu = #handwashing + #Influenza2016 jab + #antibioticguardian + #gentle fist bump

The first hashtag in the example above is used as a prompt marker (*#tips*), which attempts to normalize individual health behaviours at the community level by introducing four suggested actions. The salience of their meanings is signalled by the single hashtags, and again the actions are summed together to construct a comprehensive meaning of health change.⁸ The intra-sentential spacing technique is first adopted in order to connote individual actions with community-based meaning (*to prevent spreading flu*). Moreover, the hashtag prompt marker also regulates the new behaviour of fist bumping, thus reflecting the findings of recent scientific studies, which consider that this social practice can reduce the transmission of bacteria more

⁸ See also Example (1) for the same semiotic technique of constructing meanings of health change.



than the handshake.⁹ Interestingly, the use of the @-mention shows how #AntibioticGuardian is a dynamic site which cooperatively accommodates other campaigns, such as the National Health Service (NHS) Flu Fighter campaign in the common fight against AMR.

In shaping an *informative* type of discourse, hashtags are, instead, significantly used to construct fear appeals (93.7%), as illustrated in Example (9):

- (9) In 30yrs #antibioticresistance estimated **#to kill** more than cancer & diabetes combined. Become an #AntibioticGuardian

The hashtag *#to kill* in Example (9) is introduced to shape fear-arousing content, which represents the *threat* component of the message entailing the truly negative consequence of death. The high level of fear depicted is further reinforced by conveying information about the severity of AMR in comparison to other well-known serious diseases like cancer and diabetes. According to the Health Belief Model, this meaningful process of creating high fear is expected to have a positive influence on people in that it produces more immediate behavioural changes. The strong fear appeal appears to be efficacious as it is accompanied by *become an #AntibioticGuardian* as the action component of the message. This can be considered as the product of “response-efficacy”, or the resulting desirable consequence, whereby “strong fear appeals and high-efficacy messages produce the greatest behavior change” (Witte and Allen 2000: 591).

As the end goal of the campaign is to solicit change through commitment, the function of pledging is found to mainly characterise the social type of discourse (82.9%) mediating the communication activity of changing/reinforcing health attitudes & behaviours, as shown in Example (10):

- (10) a. I've taken **#the pledge** #ProtectAoH #antibioticguardian #will you?
b. **#Officially** an #AntibioticGuardian 🙋📋👉
c. I have **#pledged** to be an #AntibioticGuardian (better late than never🙄!)
d. #antibioticguardian - **#I pledge** - more #pharmacists have pledged than any other professional group #RPSCConf

Here, exchanges in the #AntibioticGuardian community are mainly characterised by triad interactions between health professionals (Examples 10a and 10d); health professionals and laypeople (Examples 10a and 10b), and between laypeople (Examples 10b and 10c). In (10)a, the health professional claims her own community commitment to protect All our Health (AoH) through *#the pledge* marker, which triggers a “hybrid speech act that combine[s] directive with commissive illocutionary force”, in the attempt “to direct [...] behaviour” (Hancher 1979: 6). In particular, the

⁹ See, for example, S. Mela & D.E. Whitworth, 2014, “The fist bump: A more hygienic alternative to the handshake”, *American Journal of Infection Control* 42 (8), pp. 916-917.



lexicogrammatical realisation *#will you?* directs all community participants to take a voluntary commitment to pledging. As part of a cooperative linguistic effort, the replies are spontaneous responses, marked as commissives (*#Officially*, *#pledged*, *#pledge*) by the hashtags. Interestingly, the role models represented in social discourse were mainly of two types, namely *technosocial* and *sociocultural*, as indicated respectively in Example (11):

- (11) a. As an *#AntibioticGuardian* I just added a *#Twibbon* to my profile
b. Japan health authorities have resorted to *#anime* *#superheroes* to promote *#antimicrobialresistance*

In (11)a, the author's claim of adding a twibbon, or Twitter ribbon, to her profile is marked by the hashtag to construct the technosocial meaning of showing others her extreme awareness of the AMR issue. The practice itself is the technological expression of the more traditional act of wearing awareness ribbons to support or raise consciousness of serious diseases. In (11)b, instead, the first two hashtags mark the Japanese cartoon characters as AMR role models, and are thus embedded with sociocultural meaning.

Finally, although *instructional* discourse was much less used to drive the public health campaign (6.8%), it was mostly shaped by the discourse function of making scientific information easier to understand (87.1%). At the lexicogrammatical level, the function was recurrently rendered through the interactional question *did you know?* as indicated in Example (12):

- (12) *#Did you know* *#antibiotics* do not get rid of colds or flu?

The first hashtag above aims at evaluating participants' level of health literacy by implicitly questioning "the degree to which an individual has the capacity to [...] understand basic health information".¹⁰ Since the propositional content may be considered as popular health information, the question is rhetorical, rather than one seeking information from participants. It thus appears to place less emphasis on the information conveyed, and more stress on the interactional meaning involved.

Results from the analysis conducted to address the second research question show that the discourse functions prevailingly used belong to the regulatory and informative types of discourse (75.7%), thus consistently reflecting the overall goal of the *#AntibioticGuardian* campaign.

On the whole, the micro and macro data from the positive discourse analysis reveal a significant UGC pattern of hashtagged discourse in *#AntibioticGuardian*. At the micro-discursive level, lexical salience, as the mapping between lexical items and their encoded meanings, is mainly constructed through the device of intra-sentential

¹⁰ Centre for Disease Control and Prevention, <www.cdc.gov/healthliteracy/learn/index.html> (2 October 2017).



spacing; arithmetic additions are frequently employed to make the key meaning of health change easily understandable to the lay public. On the other hand, domain-specific meanings are mediated through the use of health jargon, which is rendered through recurring scientific abbreviations. Syntactically, different hashtag positions determine different types of meanings, namely cohesive-coherent meanings of engagement in health changes (infix), experiential meanings of processes of health change (prefix) and interactional meanings of change for the better (suffix). Furthermore, interactional meanings of health values referring to AMR desirability/undesirability are conveyed through evaluative adjectives along the *good-bad* parameter, whereas the interpretation of health content in terms of relevance/irrelevance is marked by evaluative adjectives pertaining to the parameter of *importance*. Key features of the hashtagged discourse pattern at both the micro- and macro-discursive levels are summarised in Table 3.

<i>Discourse Level</i>	<i>Constructing Meanings</i>	<i>Main Typographic, Linguistic and Discursive Features</i>
<i>Micro</i>	<ul style="list-style-type: none">• lexical salience• comprehensible meaning of health change• health jargon• cohesive-coherent meanings of engagement in health changes• experiential meanings of processes of health change• interactional meanings of change for the better• interactional meanings of health values: desirability/undesirability• health content interpretation: relevance/irrelevance	<ul style="list-style-type: none">– intra-sentential spacing– arithmetic operation (addition)– scientific abbreviations– hashtag in infix position (endophoric reference)– hashtag in prefix position (present progressive verbs)– hashtag in suffix position (evaluative action verbs)– <i>good-bad</i> parameter (evaluative adjectives)– <i>importance</i> parameter (evaluative adjectives)
<i>Macro</i>	<ul style="list-style-type: none">• prompting changes to regulate community-level health behaviour• creating high fear for positive influence on people's behavioural changes• soliciting change through social commitment and awareness• making scientific information easier	<ul style="list-style-type: none">– hashtag as a prompt marker– hashtag as a fear marker– hashtag as a pledge marker– hashtag as a technosocial marker– hashtag as a sociocultural marker– hashtag as a marker of health



	to understand	literacy
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Table 3. The pattern of hashtagged discourse in # AntibioticGuardian.

At the macro-discursive level, Table 3 shows how hashtags operate as markers to capture nuances of health change, ranging from regulating and influencing public health behaviour to raising social awareness and disseminating health knowledge.

5. CONCLUDING REMARKS

The 140-character limitation of Twitter is triggering a wide range of user-driven processes leading to innovative kinds of meaning-making practices. The present study has highlighted the new role played by the hashtag in the emerging practice of public health campaigning by taking the case of #AntibioticGuardian. Overall, the investigation has helped unveil a developing tagging culture, whose main purpose is to promote 'domain-specific' content in Twitter, thus moving far beyond the common practice of daily chitchatting. Accordingly, the Positive Discourse Analysis has shown how significant lexicogrammatical and semantic processes of health change are shaped through different stratal features marked by the hashtag. The research findings have, in fact, revealed that the #hashtag symbol can be endowed with a number of micro-discursive features, and appropriated for multiple macro-discursive functions for the end goal of changing people's health attitudes and behaviours.

Furthermore, although hashtagged health discourses were found to construct new forms of meaning, these appeared to adhere to the set of communication activities, which conventionally frame successful public health campaigns. In particular, hashtags were prevalently used to respond to the communicative activity of providing cues for action consistently with the mission of the campaign. Although this regulatory type of discourse appeared to prevail over the informative, instructional and social discourses pertaining to the other three communicative activities, it acquires particular significance in understanding the interpersonal dynamics triggered by the hashtag. Unlike traditional top-down media campaigns, where regulatory discourse is mediated through unidirectional communication from health professionals to the lay audience, health promotion in the #AntibioticGuardian campaign is featured by triad interactions between health professionals, health professionals and laypeople, and between laypeople. In other words, the hashtag seems to foster interactive health discourse, which summons greater engagement in the global struggle against priority health issues, such as AMR. This kind of interactive communication is driven by the specific use made of Twitter, showing how the medium can be exploited to create discussion communities for important purposes. As hashtagged discourses are increasingly being adopted by leading health organizations, such as Public Health England, the hashtag allows health experts to transform the manner in which they interact with consumers. Further research on



other public health campaigns on Twitter may prove helpful to gain a deeper understanding of these discursive dynamics, which are meaningfully featured by the use of the simple #hashtag symbol.

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