

1 **Ageing, old age and older adults: A social media analysis of dominant topics and**  
2 **discourses**

3

4 ***ABSTRACT***

5 Whilst representations of old age and older people in traditional media have been well documented,  
6 examinations of such representations within social media discourse are still scarce. This is an  
7 unfortunate omission because of the importance of social media for communication in  
8 contemporary society. In this study, we combine content analysis and discourse analysis to explore  
9 patterns of representation in Twitter around the terms ageing, old age, older people, and elderly  
10 with a sample of 1,200 tweets. Our analysis shows that ‘personal concerns/views’ and ‘health and  
11 social care’ are the predominant overall topics, although some topics are clearly linked with  
12 specific keywords. The language often used in the tweets seem to reinforce negative discourses of  
13 age and ageing that locate older adults as a disempowered, vulnerable and homogeneous group; old  
14 age is deemed a problem and ageing is considered something that needs to be resisted, slowed, or  
15 disguised. These topics and discursive patterns are indeed similar to those found in empirical  
16 studies of social perceptions and traditional media portrayal of old age, which indicates that social  
17 media and Twitter in particular appears to serve as an online platform that reproduces and  
18 reinforces existing ageist discourses in traditional media that feed into social perceptions of ageing  
19 and older people.

20

21 ***KEY WORDS*** – ageing, ageism, content analysis, discourse, old age, older people, Twitter.

22

23 **Introduction**

24 Ageing, in the sense of ‘later life’, is simultaneously a collective and a personal experience. It is not  
25 simply a matter of chronological or biological changes, but a complex and dynamic process

26 between the body, self, and society (Hepworth, 2000). We are particularly interested in exploring  
27 this interaction between the way we present ourselves, the way we perceive our bodies, and the  
28 societal attitudes towards growing older. In our everyday lives, we encounter innumerable  
29 representations of ageing and older people that ultimately shape our views and understandings.  
30 Posting messages on Twitter is an extension of our everyday interactions and, consciously or  
31 unconsciously, we hold an image of ageing and older people. This image may be reflected in our  
32 personal tweets.

33 While age-based stereotypes and attitudes towards older people have been widely explored, these  
34 issues remain under-examined in the context of social media with the exception of a study about  
35 ageism on Facebook (Levy *et al.*, 2014), which consisted of a content analysis of 84 Facebook  
36 groups' description sections about older people. Thus, Twitter, a popular web-based social  
37 networking microblogging platform, seems to be a suitable site to explore what people talk about  
38 when discussing topics related to old age, ageing and older people. In order to fill this gap, our  
39 study aims to (1) examine 1,200 tweets about ageing, old age, elderly, and older people, (2)  
40 categorise the topics and the type of sentiment (positive, neutral, or negative) shown in the tweets,  
41 and (3) identify the predominant discourses of ageing and old age expressed in them.

42

## 43 **Background**

### 44 *Markers of old age*

45 There are several ways (*e.g.* socio-economic roles; biophysical functioning) to locate people within  
46 certain stages in the life-course, and specifically, in later life. Merely for convenience and  
47 practicality, social scientists frequently opt for using chronological age to define their study groups.  
48 Whilst the United Nations (2017) refers to older people as those aged 60 and over, most developed  
49 countries currently use the ages of 60 or 65 to set as the beginning of old age, usually coinciding  
50 with the moment at which a person is eligible to retire from work and receive pension benefits.

51 Despite being the most accessible approach to measure old age, chronological age is not a precise  
52 marker of old age as it has its limitations. This is mainly because both ageing and old age are  
53 unique and complex experiences in which categories such as social class, gender, and race exert a  
54 significant influence across the life-course (Victor, 2005). Accordingly, other approaches have been  
55 proposed. For instance, Laslett argues that “an individual may be thought of as having several ages,  
56 though not entirely distinct from each other, and related in slightly confusing ways, because they  
57 differ somewhat in character [...]” (1989: 24). In this sense, an individual has both a ‘personal age’,  
58 that refers to an individual’s own specific transitions in the life-course attained in relation to  
59 personal goals, and a ‘subjective age’, which is the age that a person experiences themselves to be,  
60 which may remain ‘constant’ (Laslett, 1989).

61 As Uotinen (2005) contends, Laslett’s definition of subjective age is consistent with the same  
62 phenomenon that Kaufman (1985) identified as the ‘ageless self’ or what Featherstone and  
63 Hepworth (1991) theorised as ‘the mask of ageing’ in reference to “the experience of people who  
64 report strong *stability* in the sense of a self that is unchangeable [regardless] of the changes that  
65 occur in the body” (Uotinen 2005: 12 emphasis added). Furthermore, a person can have a  
66 ‘biological age’, which is based on age-related biological and functional changes to predict the rate  
67 of ageing (*see* Bürkle *et al.*, 2015; Levine, 2013; Mitnitski *et al.*, 2002); a ‘social age’, which refers  
68 to an individual’s “roles and habits with respect to other members of the society of which he [or  
69 she] is a part.” (Birren and Cunningham, 1985: 8 cited in Settersten and Mayer, 1997: 239); and  
70 ‘psychological age’, which is based on the “behavioural capacities [*e.g.* memory, feelings] of  
71 individuals to adapt to changing demands.” (Settersten and Mayer, 1997: 240).

72 The perception of old age and older people changes according to an individual’s own life stage or  
73 phase. Younger people tend to consider the onset of old age at an earlier chronological age than  
74 older people themselves (Australian Human Rights Commission, 2013; Musaiger and D’Souza,  
75 2009; Portal Mayores, 2009). Several studies on age group perceptions have found that older adults  
76 have a more complex age identity and representation of their age group than young and middle-

77 aged adults (*e.g.* Brewer and Lui, 1984; Heckhausen, Dixon and Baltes, 1989; Hummert *et al.*,  
78 1994), as they often report a higher age discrepancy reflected in *feel-age* (the age a person feels)  
79 and *look-age* (the age a person thinks she or he looks). This implies a certain dissociation between  
80 the exterior body or *look-age* and the inner subjective self or *feel-age* (Öberg and Tornstam, 1999).

### 81 *Social perception of old age*

82 Research on social perceptions and self-perceptions of older people show that old age and older  
83 people tend to be associated with negative attributes such as loneliness, mental incompetence,  
84 decline in attractiveness and mobility, ill-health, and senility (*e.g.* Cheung, Chan and Lee, 1999;  
85 Hurd, 1999; Kite, Deaux and Miele, 1991; Kite and Wagner, 2002; Löckenhoff *et al.*, 2009; North  
86 and Fiske, 2012). Older people have been viewed with pity, perceived as fragile, sickly, forgetful,  
87 helpless, incompetent and not socially valued (Cuddy, Norton and Fiske, 2005; Kite and Johnson,  
88 1988; Macia *et al.*, 2009; Wright and Canetto, 2009). Regarding emotional aspects, older people  
89 have been viewed as conservative, suspicious, secretive, intolerant, irritable, moody, pessimistic  
90 and unadaptable (Arnold-Cathalifaud *et al.*, 2008; Gellis, Sherman and Lawrance, 2003; Musaiger  
91 and D'Souza, 2009; Okoye and Obikeze, 2005). Overall, younger people tend to hold less positive  
92 perceptions about older people than older people have about themselves (Abrams *et al.*, 2011), as  
93 evidenced in a recent study by The Royal Society for Public Health (2018: 5), which found that one  
94 in four 18-34 year olds consider that being unhappy and depressed in old age is normal and that  
95 older adults can never be regarded as attractive.

96 Whilst most studies, especially related to Western societies, and to a lesser extent to Eastern  
97 cultures (*e.g.* Luo *et al.*, 2013), have shown that perceptions of older people are predominantly  
98 negative, a few have found positive perceptions. The positive social image of old age is  
99 predominantly linked to wisdom, experience, and respect (Löckenhoff *et al.*, 2009; Macia *et al.*,  
100 2009; Sung, 2004), and the contribution of older people to society has also been recognised  
101 (European Commission, 2009). Such differing images of old age suggest that assessments are  
102 influenced by people's own ageing experience and demographic, psychosocial, and cultural

103 variables (Chappell, 2003; Moreno *et al.*, 2016; Sánchez Palacios, Trianes Torres and Blanca  
104 Mena, 2009). For instance, older adults surveyed from Singapore and from specific cities in  
105 Senegal, Morocco, and France considered that older people were well-respected in their societies  
106 and perceived respect, wisdom, and experience as attributes of old age (Macia *et al.*, 2009; Macia *et*  
107 *al.*, 2015; Mathews and Straughan, 2014). Older people from five Pacific Rim nations (Australia,  
108 People's Republic of China (PRC), Hong Kong, Philippines, and Thailand) linked kindness  
109 positively to old age. Interestingly, both Hong Kong and PRC reported significantly negative  
110 attitudes towards old age on the variable of wisdom, which may be rooted in an apparent pattern of  
111 decline in the norms of filial piety in Chinese society (Harwood *et al.*, 2001).

112 Most of these perceptions about old age and older people seem to be broadly shared across cultures,  
113 especially those linked to biological changes (Harwood *et al.*, 2001; Löckenhoff *et al.*, 2009). There  
114 is evidence that (both positive and negative) stereotypes linked to a particular social group (*e.g.*  
115 children, older people) affect the cognitive performance and behaviour of the members of that  
116 group (Ambady *et al.*, 2001; Levy *et al.*, 2002; Steele, 1997; Wheeler and Petty, 2001). It has been  
117 demonstrated that both consciously and unconsciously activated ageing stereotypes influence older  
118 peoples' personality (Kornadt, 2016), their cognitive performance (Hess *et al.*, 2003; Levy, 1996)  
119 and their behaviour (Bargh, Chen and Burrows, 1996), including the will to live (Levy, Ashman  
120 and Dror, 2000). For instance, a study investigating whether self-perceptions affected longevity  
121 found that older people with more positive ageing self-perceptions lived longer (a median of 7.6  
122 years longer) than those with less positive self-perceptions; self-perceptions had a greater impact on  
123 survival than other factors such as gender, socioeconomic status, functional health, or feelings of  
124 loneliness (Levy *et al.*, 2002).

### 125 *Portrayal of old age and older people in mass media*

126 Considering the significant influence of mass media on (re)producing collective discourses,  
127 attitudes, and behaviour patterns, several studies have examined the portrayal of ageing and older  
128 people in traditional media, especially print and broadcasting (*e.g.* Lee, Carpenter and Meyers,

129 2007; Prieler et al., 2015; Ylänne, Williams and Wadleigh, 2009). Unsurprisingly, most of this  
130 research has found that socially valued groups are frequently and positively portrayed in the media  
131 whereas less valued groups are featured in a negative light or ignored (Harwood and Roy, 1999).  
132 For instance, an examination of 100 top films of 2015 found that only 11 per cent of 4,066 speaking  
133 characters were aged 60 or older; such underrepresentation is yet more prominent for older women,  
134 people of colour, and LGBT older adults (Smith *et al.*, 2015).

135 Similarly, some studies have found that older people, and particularly older women, are  
136 underrepresented in advertising media (*e.g.* Harwood and Roy, 1999; Kessler, Rakoczy and  
137 Staudinger, 2004; Lee, Carpenter and Meyers, 2007; Prieler *et al.*, 2015; Ramos Soler and Papí  
138 Gálvez, 2012), generally portrayed through negative stereotypes (*see* Ylänne, Williams and  
139 Wadleigh, 2009) and playing minor roles (*see* Zhang *et al.*, 2006). Few empirical studies, however,  
140 have examined the potential effects media representations may have on older people's health and  
141 wellbeing (*see* Wangler, 2014).

#### 142 *Twitter as a source of age and ageing discourse*

143 People use language to convey opinions reflecting - partially - their attitudes and perceptions.  
144 Ageist language usually shows clear stereotyped images or perceptions of old age and older people.  
145 However, it is not always easily identifiable. For instance, a young person showing surprise by  
146 finding an older person acting outside their expected social role (Gendron *et al.*, 2016) is rather  
147 ageist, albeit perhaps unintentionally.

148 Social media sites, like Facebook and Twitter, have become popular web-based communication  
149 platforms, widely adopted by a young population (Sloan *et al.*, 2015). Whilst some older adults see  
150 benefits in the use of social media (Braun, 2013), especially associated with the social dimension  
151 (Díaz-Prieto and García-Sánchez, 2016; Jung and Sundar, 2016), its adoption, although rising, is  
152 still limited (Vroman, Arthanat and Lysack, 2015). For instance, a report from *Pew Research*

153 *Center* found that in 2005 only two per cent of interviewed American people (aged 65 and over)  
154 used social media, compared to 11 per cent in 2010 and 35 per cent in 2015 (Perrin, 2015).

155 Twitter users can share messages known as ‘tweets’ or ‘posts’, including weblinks, images, or  
156 videos. Until November 2017 tweets had been limited to 140 characters, but this limit has now  
157 increased to 280 characters for all languages, except Japanese, Korean and Chinese (which have no  
158 cramming issues) (Twitter, 2017). Twitter is one of the most popular social network sites  
159 (Schneider and Simonetto, 2017); since its launch in 2006 it has grown exponentially (Liu, Kliman-  
160 Silver and Mislove, 2014), having at present around 326 million monthly active users (Statista,  
161 2019), who use the platform to talk about daily activities, share opinions and report news (Java *et*  
162 *al.*, 2007). Therefore, it seems a suitable platform to examine the main themes and dominant  
163 discourses of ageing and old age present in people’s everyday tweets.

#### 164 *Research Questions*

165 The aim of this study was to explore what and how people talk about when ‘tweeting’ about old  
166 age, older people, ageing, and elderly. The analysis was guided by the following questions:

- 167     ▪ RQ1: Which topics are mentioned in conversations about old age, older people, ageing, and  
168       elderly on Twitter?
- 169     ▪ RQ2: What type of sentiment (positive, neutral, or negative) occurs in conversations about  
170       old age, older people, ageing, and elderly on Twitter?
- 171     ▪ RQ3: What are the dominant discourses within conversations about old age, older people,  
172       ageing, and elderly on Twitter?

173

#### 174 **Methodology**

175 Our research design involved a sequential mixed-method approach by conducting content analysis  
176 (CA) and discourse analysis (DA) to examine digitally-mediated communication around the terms  
177 ageing, old age, older people, and elderly in a sample of 1,200 tweets. Whilst DA and CA originate  
178 from different philosophical stances (constructivist and positivist, respectively) we argue that they

179 are complementary since the two methods are both interested in exploring the nature of social  
180 reality, particularly that of language. In this sense, CA offers identification of the “pragmatic”  
181 contexts and patterns of Twitter communication, whilst DA provides a more nuanced interpretation  
182 of their meaning (*see* Neuendorf, 2004). Thus, their quantitative-qualitative methodological  
183 combination allows a systematic and deeper analysis of the data set. From this perspective, as  
184 Hardy, Harley and Phillips (2004: 22) argue, combining these two methods is ‘an exercise in  
185 creative interpretation that seeks to show how reality is constructed through texts that embody  
186 discourses’ in which meaning cannot be separated from social context and any attempt to count and  
187 code must include a sensitivity to the usage of words.

#### 188 *Data collection*

189 Tweets can be collected from Twitter based on either searching for keywords from the main text of  
190 a tweet or with the use of hashtags. Hashtags are tags preceded by the hash (#) symbol (*e.g.*  
191 #ageing) and they are generally used to index topics contained within a tweet, allowing users to  
192 follow conversations about particular topics. Since not everyone uses hashtags we only searched for  
193 keywords within tweets.

194 Tweets were collected with Mozdeh (<http://mozdeh.wlv.ac.uk/>), a free program that gathers tweets  
195 matching specified keywords (Thelwall, 2009). After testing their suitability in pilot studies, we  
196 selected the keywords ‘ageing’, ‘old age’, ‘older people’, and ‘elderly’ as the main terms that  
197 capture relevant posts. Including multiple terms allows a comparison between the sets, which may  
198 reveal framing differences between them.

199 The final data sample was gathered during one week in August 2016 (Tuesday 9<sup>th</sup> – Monday 15<sup>th</sup>)  
200 to include both weekdays and the weekend (Table 1). From the 185,258 tweets collected, a random  
201 sample for classification of 1,200 tweets (300 tweets for each keyword) was selected using Excel’s  
202 random number generator. Although there were significant differences in the total number of tweets  
203 extracted for each keyword, equal sample sizes (Kim *et al.*, 2018) were selected to give a balanced

204 set. This maximises the reliability of comparisons between keyword groups. To ensure an ethical  
205 approach in the use and reproduction of social media data, Twitter handles (profile usernames),  
206 URLs, and information contained within tweets that may allow specific users to be identified have  
207 been removed from tweets reported in this paper, except for institutions and public figures. In some  
208 instances, tweets from personal accounts have been paraphrased as direct quotes might reveal the  
209 user's profile, compromising anonymity (Townsend and Wallace, 2016).

210 < Insert Table 1 about here >

### 211 *Content analysis of tweets and reliability*

212 In order to answer RQ1 and RQ2, we employed a content analysis methodology. Content analysis  
213 is a research technique for making replicable and valid inferences from texts and other meaningful  
214 matter, and a process for categorising such matter into a set of classes that are relevant to the  
215 research goals of a particular investigation (Krippendorff, 2004).

216 The first three authors conducted a first pilot study based on a random sample of 100 tweets (across  
217 all keywords) in order to build a content analysis scheme. Following an inductive approach, themes  
218 were identified, discussed and agreed upon and this produced an initial scheme with 14 categories.  
219 We then conducted a second pilot study based on another random sample of 100 tweets (across all  
220 keywords) in order to test the reliability of the coding scheme. We calculated the intercoder  
221 reliability coefficient (the degree by which two or more coders agree in their individual assessments  
222 made about the facets rated in a study). The overall Cohen' Kappa score was 0.442.

223 There are two scales of values commonly used for classifying agreement rates. Landis and Koch  
224 (1977) described 0-0.20 as slight agreement, 0.21-0.40 as fair agreement, 0.41-0.60 as moderate  
225 agreement, 0.61-0.80 as substantial agreement, and 0.81+ as almost perfect agreement. Fleiss  
226 (1981) reported 0-0.39 as poor agreement, 0.40-0.75 as fair to good, and 0.75+ as excellent. From  
227 these, a value of 0.4 might be seen as an acceptable agreement level. However, we pre-established a  
228 minimum agreement rate of 0.6, so the intercoder reliability coefficient achieved in the pilot study  
229 (0.442) was insufficient. The coding scheme was therefore re-worked, with some categories being

230 merged, and others being deleted, resulting in a revised coding scheme of 12 categories (*see* Table  
231 2). A new facet was also added to assess the sentiment of the tweets, coding them as positive,  
232 neutral, or negative.

233 In order to test whether the reliability of the revised content analysis scheme had improved, a third  
234 pilot study was conducted with a small sample of 30 tweets (across all keywords). This pilot study  
235 achieved an overall Cohen's Kappa score of 0.654 for the subject facet, and 0.651 for the sentiment  
236 facet.

237 The first three authors then each classified the final sample of 1,200 tweets (300 for each keyword).  
238 The final Cohen's Kappa scores achieved for the subject and sentiment facets were 0.633 and 0.578  
239 respectively. Whilst the agreement rate for the sentiment facet was slightly below the desired 0.6  
240 threshold, on examining the agreement rates between coders, it was found that coder B was  
241 interpreting sentiment in a slightly different way to coders A and C (*i.e.* Coders A and B – 0.495 /  
242 Coders A and C – 0.674 / Coders B and C – 0.564).

243 < Insert Table 2 about here >

#### 244 *Discourse analysis of tweets*

245 To answer RQ3, we conducted discourse analysis on the 1,200 tweets sample. Discourse analysis  
246 (DA) as a term covers a range of theoretical approaches and techniques for *reading* written, oral,  
247 visual, and other data; 'characterised by a common interest in de-mystifying ideologies and power  
248 [relations] through systematic and transparent' (Unger *et al.*, 2016: 2) examination of the use of  
249 language in specific contexts. For this article, we were interested in forms of communication that  
250 support knowledge production within Twitter and how these express relationships with other  
251 knowledge producing fields and institutions within the broader societal context (Wodak, 2014) (*e.g.*  
252 traditional media; academia), and how this knowledge is organised, produced and reproduced.  
253 Therefore we approached DA as a method informed by social constructionism – a critical stance  
254 towards analysing how social problems, in this case, how understandings of ageing and older

255 people are ‘constructed and presented in a broader intertextual and socio-political (con-)text’  
256 (Siiner, 2017: 6).

257 DA does not focus on a specific linguistic unit but rather on complex social phenomena that require  
258 an approach that draws from different disciplines such as linguistics, semiotics, philosophy, media,  
259 cultural, and literary studies (Unger *et al.*, 2016). DA is interdisciplinary and although it is well-  
260 established within qualitative research, there is no specific or prescribed method of analysis; it  
261 usually consists of several readings through the data to identify implicit and explicit discourses  
262 (Wodak and Fairclough, 1997). Accordingly, our DA began with authors one, two and three  
263 conducting a pilot study (N=120 tweets) that consisted of an independent open-coding process  
264 focused on the language in which acts or actors were being described, patterns, cultural references,  
265 social and political practices, and debates. After coding the pilot sample, we discussed all open  
266 codes and agreed on a working set of categories. Since the analysis unit was the text of a tweet, we  
267 decided to first focus at the micro-level or discourse fragment. In line with common practice, we  
268 did not include the pilot sample as part of the final analysis and divided the remaining 1,080 tweets  
269 amongst ourselves (*i.e.* first three authors classified 360 tweets each – 90 tweets per keyword). We  
270 applied the working coding framework, taking notes during the process, especially if more than one  
271 category was used. We met frequently via Skype to discuss and compare our coding and delimit or  
272 expand coding categories. To facilitate consistency, we revised each other’s coding (author one  
273 checked author two’s coding, who reviewed author three’s and the latter checked the coding of  
274 author one). After all revisions were completed, author one compared the codes, especially looking  
275 at discrepancies to develop a consensus. We then calculated the frequencies of the coded categories  
276 across the whole sample (integrating the four keywords data sets). At this stage, we undertook  
277 further analysis to cluster codes together in order to map out the dominant discourses within our  
278 corpus: ‘discourse of older adults’ human rights’; ‘discourse of anti-ageing culture’; ‘discourse of  
279 active and healthy ageing promotion’, and ‘discourse of decline’.

## 280 **Findings**

281 *Topics mentioned in tweets*

282 Amongst our sample, ‘personal concerns/views’, and ‘health and social care’ are the predominant  
283 overall topics, whereas issues related to an ‘ageing workforce’, and ‘age-friendly initiatives’ are the  
284 topics least mentioned.

285 Tweets about ‘old age’ and ‘older people’ mainly convey ‘personal concerns/views’, accounting for  
286 52.7 per cent, and 42.3 per cent of those tweets respectively. Issues related to ‘health and social  
287 care’ account for 31 per cent of tweets related to ‘older people’. In tweets about ‘ageing’ and  
288 ‘elderly’ there is no predominant theme. The topics ‘personal concerns/views’ and ‘health and  
289 social care’ prevail in tweets related to both of these keywords, although ‘anti-ageing promotion’  
290 (29%) is the most predominant topic in tweets about ‘ageing’.

291 Some topics are clearly linked with specific keywords. For instance, ‘anti-ageing promotion’ and an  
292 ‘ageing population’ are mentioned more in tweets about ‘ageing’, whereas tweets describing  
293 ‘intergenerational relations’ tend to be associated with ‘elderly’. Most tweets reporting a type of  
294 ‘abuse’ belong to ‘elderly’. This suggests that when reporting events related to older adults being  
295 subject to abuse or neglect, tweeters tend to use the term ‘elderly’ more often than any of the other  
296 terms. Table 3 gives a breakdown of the proportion of tweets that were associated with each  
297 keyword and topic and Table 4 reports examples of tweets that related to the 12 topic categories,  
298 across each of the four keywords.

299 To determine if there were statistically significant relationships in the data, we performed two Chi-  
300 square analyses. Since Chi-square analyses work by examining the relationship between two  
301 variables (Vaughan, 2001) we reached a consensus of the three-coders classifications regarding the  
302 topic and sentiment of each tweet. For most tweets, at least two coders agreed on a classification  
303 and this partial consensus was used. When all three coders disagreed, they discussed their opinions  
304 and rationales, and reached an agreed code. A Pearson Chi-Square value of 322.1 ( $p=0.000$ ) gives  
305 strong evidence of a relationship between topic and sentiment. In order to perform the Chi-square

306 analyses it was necessary to remove topic categories with low frequencies, and thus only topic  
307 categories 1, 2, 3, 4, 6, 11, and 12 were included in the comparison of topic and sentiment.

308 < Insert Table 3 about here >

309

### 310 *Sentiment shown in tweets*

311 The sentiment expressed in the sampled tweets is mainly neutral (*e.g.* “elderly man finally sells his  
312 house”; “firms in ageing Thailand bet on demand surge for robots and diapers”), although  
313 proportions vary among keywords (*see* Table 3). In tweets about ‘old age’ we can find more  
314 generally both positive and negative sentiment (*e.g.* “one of the many pleasures of old age is giving  
315 things up”; “that old age smell”, respectively) than in the other keywords. A Pearson Chi-Square  
316 value of 89.0 ( $p=0.000$ ) gives strong evidence of a relationship between keyword and sentiment.  
317 For example, positivity was most common for ‘old age’ and least common for ‘elderly’. Similarly,  
318 negativity was most common for ‘old age’ and least common for ‘ageing’.

319 < Insert Table 4 about here >

### 320 *Dominant discourses of ageing and old age in tweets*

321 During our analysis we identified a connection between some of the topic categories and the  
322 dominant discourses present in the tweets. For instance, both the discourse of ‘older adults’ human  
323 rights’ and the ‘promotion of active and healthy ageing’ are frequently found amongst the topics of  
324 ‘health and social care’, ‘ageing population’, ‘age-friendly initiatives’, and ‘intergenerational  
325 relations’. The most direct link was found between the topic ‘anti-ageing promotion’ and the  
326 discourse of ‘anti-ageing culture’, whereas the discourse of ‘decline’ is linked to the category of  
327 ‘personal concerns and views’.

328 The sections below describe the dominant discourses identified in our sample by discussing the  
329 underlying categories that integrate them and illustrating each discourse with examples of coded

330 tweets from different keywords (*see* Table 5 for a complete list of discourse categories). We draw  
331 on theories within social gerontology whilst also reflecting on the wider societal and political  
332 context.

333 *Discourse of older adults' human rights.* The discourse pertaining to the limitations in health, social  
334 care and social security provision along with the shrinking of values and traditional family support,  
335 and its impact on older people's wellbeing and autonomy was the most prominent within our  
336 corpus (N=331), especially for the 'elderly' and 'older people' keywords. Many tweets within this  
337 discourse use a language that promotes moral obligation at individual, community, and institutional  
338 level. The common message is that of championing the rights and interests of older people and  
339 condemning instances of age discrimination, poor or inadequate access to health and social care  
340 services and facilities, abuse and neglect, and limited access to express their own views themselves.  
341 This is on the basis that older adults are valuable members of society from having contributed  
342 throughout their lives and therefore should be given or shown a dignified or priority treatment, as in  
343 the case of other groups (*e.g.* children, women, LGBT), which have received particular attention  
344 and their own international human rights movement and legal frameworks (Megret, 2010). The  
345 following are some examples:

346 "Older people less likely to talk about money, mainly because don't have opportunity. Our report for  
347 @yourmoneyadvice <https://t.co/tGAGjMh3Ea>"

348  
349 "RT @Age\_Matters: Good to see more Irish equality campaigners 'getting' ageing - Respecting your elders  
350 is the really important work"

351  
352 "Older people must be meaningfully involved in decisions about care – via @QCareQualityComm  
353 <https://t.co/2wrokAK8EN>"

354 Although these examples are mainly framed by advocacy and awareness appeals, within this  
355 discourse there is a paradox of empowerment and vulnerability. Whilst the aim of such discursive  
356 practices may be to bring attention to the views, experiences, and rights of older adults, in some  
357 instances they reinforce and reproduce the social construction of older people as a dependent and an  
358 at-risk population; vulnerable to certain types of crime or abuse (*i.e.* financial), weather conditions,

359 and physical and social factors affecting their wellbeing. Such social construction of older adults  
360 may give way to a burdensome responsibility or what Binstock referred to as ‘compassionate  
361 ageism’ (*see* Binstock, 1985). The choice of language in this subgroup of tweets (N=49) is  
362 therefore significant - older adults are ascribed a collective identity of ‘elderly victims’ that need to  
363 be ‘rescued’:

364 “PERTSHIRENEWS: Jail for thief who preyed on elderly victims <https://t.co/Rg3dOrAsWD>”

365  
366 “Older people are more at risk of health problems in the heat. #beafriend & share these tips from  
367 @NHSChoices <https://t.co/r5Bxx7Qhqc>”

368 “Elderly woman rescued after dialysis clinic closes with her inside - An 86-year-old Massachusetts woman  
369 needed to be <https://t.co/We1vvW3KUY>”

370

371 *Discourse of anti-ageing culture.* ‘Anti-ageing’ is quite a popular term, conspicuously creating a  
372 ‘consumerist culture’ (Katz, 2002) saturated with beauty and fashion adverts in traditional media  
373 and biomedical professional outlets. In an increasingly ageing society it is not surprising that there  
374 seems to be a universal desire to *look young* (Barak *et al.*, 2001). The past two decades have  
375 witnessed an upsurge in the use of cosmetics and aesthetic medical treatments (American Society  
376 of Plastics Surgeons, 2017) to enhance body image (Slevec and Tiggemann, 2010) in order to reach  
377 ‘Western’ societies’ standards of beauty. Given the ever growing promotion of products, activities  
378 and practices labelled as anti-ageing and aimed at tackling the ‘*problems* of old age’ (Vincent,  
379 Tulle and Bond, 2008: 291 emphasis added), we had expected to find a larger subsample of tweets  
380 adhering to this discourse (N=110). Most of the tweets in this category were (a) advertisements of  
381 cosmetics, beauty treatments, activities, and so-called superfoods that promised to slow, stop or  
382 even reverse the effects of ageing and prolong our lives (*see* Binstock, 2004; Moody, 2001) and (b)  
383 posts about scientific research evidence on anti-ageing medical treatments and drugs:

384 “#EsteticaVisoCorpoEGambe Anti-ageing treatments: Electronic Skin Microneedling. Read Blog:  
385 <https://t.co/gdCG6MMR2w>”

386

387 “#Facial exercises: Face #yoga is here and THIS is what you need to know... | Marie Claire Blogs  
388 <https://t.co/Gk7EhDe7Yb> via @marieclaireuk [title displayed on website reads: 5 anti-ageing facial  
389 exercises you can do at home]”

390  
391 “RT @TheEconomist: Anti-ageing drugs already exist. Could they prolong our lives?  
392 <https://t.co/hk6CaElTiC> <https://t.co/HIH10JO7Z9>”  
393  
394  
395 Less prominent albeit equally significant were the more personal tweets that internalised the  
396 discourse of an anti-ageing culture. In such instances, ageing was welcome as long as it was  
397 accompanied by beauty and physical fitness, whilst some (young, middle-age and older) celebrities  
398 were used as an example of how to age ‘gracefully’, ‘beautifully’ or ‘successfully’. Successful  
399 ageing is a model developed in the late 90s by Rowe and Khan (1997) that continues to be  
400 influential within theoretical paradigms of social gerontology. It has been heavily criticised for  
401 focusing on the quantifiable aspects of ageing, ‘the avoidance of disease and disability, the  
402 maintenance of high physical and cognitive function, and sustained engagement in social and  
403 productive activities” (Rowe and Kahn, 1997: 433) without taking into consideration the varied  
404 complexities of lived-experiences of ageing and old age (*see* Liang and Luo, 2012). The following  
405 examples illustrate this discourse:

406  
407 “I’ve found more gray hairs today. Can’t have five goddamn minutes of youthful attractiveness before I get  
408 slapped with old age?”  
409  
410 “Ageing beautifully at 70: What's the secret? <https://t.co/a6zputwieg>”  
411  
412 “Loved the new Jason Bourne film Matt Damon is ageing so well”  
413

414 On the other hand, celebrities who ‘fail’ to look ageless were quickly criticised - “NBC New York:  
415 Elderly Hugh Jackman Pic Prompts Concerns: A picture of an older-looking Hugh Jackman [...]”.  
416 This focus on the ideal of growing old while looking attractive and youthful discriminates any  
417 ageing alternative and produces ‘the othering of those who are unwilling or unable to age  
418 successfully’ (Sandberg, 2013: 20) and thus reproduces ageist attitudes. This age denial or  
419 ‘masquerade’ (Biggs, 2004; Woodward, 1995) is a mechanism employed to hide or protect those  
420 aspects of the self/body that in an ageist society appear to be socially unacceptable (Biggs, 2004).  
421 This discursive strategy then partially helps in dealing with one’s own ageing anxiety (Yun and  
422 Lachman, 2006), which is particularly linked to psychological concerns and fears over physical

423 appearance (Lasher and Faulkender, 1993). These fears and concerns about ageing are diverse and  
424 depend on a variety of factors, such as age, gender, culture, current health, education, family  
425 relationships, social ties, and other socioeconomic elements (Barrett and Robbins, 2008; Brunton  
426 and Scott, 2015; Lynch, 2000) that influence wider perceptions of old age and older people (Luo *et*  
427 *al.*, 2013).

428 *Discourse of active and healthy ageing promotion.* Whilst health and wellbeing are well-known  
429 benefits of being active, the development and wider promotion of an active ageing framework is a  
430 recent global endeavour endorsed since 2002 by the World Health Organisation (WHO)  
431 (Narushima *et al.*, 2018). In our sample, we found several instances (N=102) that reiterate an active  
432 and healthy ageing discourse, but most of these tweets call for older adults to remain in the labour  
433 market and keep physically fit and active. Some also praise older adults for their physical prowess,  
434 using them as inspirations for old age goals:

435 “RT @WiseAgeing: Help older people into work - free training in #bethnalgreen funded by  
436 @TrustforLondon: <https://t.co/AJW4esLeQp>”

437  
438 “Keeping fit will keep you healthier and happier in old age <https://t.co/eHSDOHJv2w>”

439  
440 “Old Age Goals [older adult in Rio turns down elderly train seat in favour of flag pole lift]”

441  
442

443 As Boudiny argues, this rather narrow approach to what constitutes ‘being active’ in old age  
444 assumes health and independence as its ultimate goals without considering [illness/pain], frailty,  
445 dependence and vulnerability (2013 cited in Narushima *et al.*, 2018: 654) as valid experiences of  
446 active ageing. There were, however, some tweets that offered a more inclusive discourse of active  
447 and healthy ageing, where the responsibility of being active was shared at the individual, societal,  
448 and government levels, more in tune with recent efforts of creating age-friendly communities that  
449 enable older adults’ active social participation (*e.g.* Buffel *et al.*, 2014; Syed *et al.*, 2017).

450 “#CARA grants to support older people to age in place and remain healthy & active now available. Closing  
451 19 August. <https://t.co/EecnuZhYxh>”

452  
453 “We should be encouraging older people to get out, socialise and exercise, not making it ridiculously  
454 expensive!”

455  
456 “Although men find it harder to maintain social relationships, it's crucial for staying healthy in old age.  
457 <https://t.co/ZbPD4IUa4J>”

458  
459  
460 *Discourse of decline.* This theme includes tweets that frame ageing and old age in negative or  
461 deficit terms (N=98); the focus was on the changing physical or cognitive capabilities that are  
462 widely normalised as characteristic of the ageing process. In many of the tweets the ‘declining’  
463 body emerges as a marker or symbol of old age on the basis that it no longer functions, looks, or  
464 feels in the same way as it used to. References to being less capable, frail, slower, weaker,  
465 forgetful, or having poor vision are common:

466  
467 “Are you concerned about the driving ability of an elderly friend or relative? How old is too old to drive?  
468 <https://t.co/a4wiUgIjXq>”

469  
470 “Like you said that's what Old age dose, brain says dive body like wait a min youth isn't on my side anymore  
471 lol”

472  
473 “I had a witty tweet but in the time it took me to press the compose tweet I had forgotten it. Welcome to old  
474 age.”

475  
476  
477 In some instances, the narrative of decline is also expressed by highlighting emotional changes in  
478 which reaching old age is equated with being more understanding or even ‘soft’ of character, as in  
479 tweets such as: “I suppose I've gone soft in my old age, everyone catch me while I'm in this mood”.  
480 Although rarer, there were also some tweets that presented a more negative construction of old age  
481 in which the narrative went from decline to imminent mortality – interestingly most of these tweets  
482 were about older political figures (*e.g.* Trump) and yet this helps illustrate how easily old age and  
483 older people can be devalued in society through powerful negative discourses.

484  
485 “They're both old enough to die of old age... And you know damn well God ain't gonna want them  
486 <https://t.co/MX4hvjKSqY>”

487  
488 “You think using an ethnic slur is cute, don't you, wrinkled, ugly old lady who will die of old age very  
489 soon?”  
490

491 In line with a narrative of decline, Tulle (2016) has explored the normative power chronological  
492 age exerts on elite athletes’ careers and how this phenomenon feeds into and reinforces social and  
493 cultural understandings of age and ageing. This discursive frame was also evident in tweets about  
494 showbiz celebrities and elite athletes. Here the focus was on their chronological age and the  
495 assumed negative impact this can have on their performance or how *despite* being of certain age  
496 they were still capable of exceeding expectations:

497  
498 “Old age is now catching on @Gastro\_o: Musa having a rubbish 2nd half, was decent in the 1st”  
499

500 “For a 54yo, Mr Snipes moves rather fast still. We are all ageing man.”

501  
502 “wow @k\_armstrong wins gold! forty-two years old age is nothing!”  
503

504  
505 Whilst social ageing may be resisted at the discursive and personal level, bodily decline is  
506 inevitable, but our societies have constructed it as something negative - abnormal. Thus, ageing as  
507 decline and loss is a rather powerful cultural narrative (Gullette, 2004) as it reinforces negative  
508 images and stereotypes of ageing and older adults without considering the great diversity there is in  
509 old age, that is - older adults experiencing decline, disability and disease can lead fulfilling lives  
510 (Kontos, 2003; Sandberg, 2013).

511 < Insert Table 5 about here >

## 512 **Discussion**

513 Based on a week of tweets, this paper addressed three research questions: (1) Which are the topics  
514 mentioned in tweets about ageing, old age, elderly, and older people?, (2) What type of sentiment is  
515 shown in those tweets?, and (3) Which discourses of age and ageing dominate within the sample?

516 Regarding the first question, our analysis shows that the majority of posts on Twitter about old age,  
517 ageing, elderly, and older people focus on ‘personal concerns/views’ which are for the most part in

518 line with negative stereotypical images of age and older adults. This finding resonates with much of  
519 the previous research on social perceptions and media representations of old age discussed earlier  
520 in this paper. The second main topic found in our sample covers the mentions of ‘health and care  
521 issues’ in two specific ways. Whilst most of this category includes tweets pertaining to older adults’  
522 care and health issues in a positive way and advocate for action and responsibility, there are also  
523 some posts that use an alarmist language (Katz, 1992) and portray old age and population ageing as  
524 an economic, political, or social *problem/burden*. This again reflects broader social views on the  
525 issues and perceived negative impact of this demographic group to society.

526 The sentiment analysis results indicate that tweets are mainly neutral, although in varying degrees  
527 between keywords. The fact that topics with a more positive outlook on old age and older people  
528 (*i.e.* age-friendly initiatives, intergenerational relations) are the least mentioned across the sample  
529 resonates with the prevalence of negative representations in media and the need for counter-  
530 narratives of age and ageing.

531 In light of this, it is not surprising that the discourses of ‘decline’ and ‘anti-ageing culture’ are  
532 (re)produced in many of the tweets. These discourses are framed in such a prescriptive way that  
533 they leave very little space for making meaning of lived-experiences of old age and in turn  
534 contribute to marginalise those people who are not masking the signs of decline and therefore are  
535 not living up to the standards of ageing ‘successfully’. As Harper (1997) notes, such an approach  
536 highlights abilities and capacities and thus normalises the “young body” whilst reinforcing stigma,  
537 fear and hostility towards visibly aged bodies.

538 As our discourse analysis shows, the discursive patterns in ‘active and healthy ageing promotion’  
539 tweets are mainly framed by a successful ageing agenda focused on how well a person can assume  
540 his/her responsibility, retain independence, and avoid or delay the losses and decline that usually  
541 accompany old age. Whilst the promotion of active and healthy ageing discourse seems to have a  
542 strong influence on public policy (especially via WHO’s active ageing and age-friendly

543 frameworks) and is itself a positive goal, it paradoxically highlights the vulnerabilities or deficits of  
544 those who are currently not able to subscribe to a social and/or physical active lifestyle in old age.

545 Most of the discourses identified in our analysis reproduce rather negative social constructions of  
546 ageing and old age, but the discourse of ‘older adults’ human rights’ is predominantly positive and  
547 underpinned by advocacy and activism for both society and government to address and provide  
548 solutions to public health and social care issues that affect older adults. Within this discourse we  
549 also identified instances in which older people were still assumed to be passive or disempowered  
550 actors – victims even. While in some situations older adults might be in such unfavourable  
551 positions, such negative characterisations may further constrain our thinking and attitudes towards  
552 older people as an homogenous devalued group, which can lead to a misinterpretation,  
553 marginalisation, or even silencing of voices (*see de Medeiros, 2005*). Language choices therefore  
554 are instrumental in producing or imposing social identities or categories on groups (*e.g. the*  
555 *disabled, the elderly*).

556

### 557 *The need for sensitive terms*

558 Even though most terms we use as part of our vocabulary are convenient they tend to stereotype  
559 people because of their generalisation and lack of specificity (*Avers et al., 2011*), giving very little  
560 room for making sense of personal lived-experiences. In this case, the terms ‘older people’, ‘older  
561 adults’, ‘older persons’, ‘senior citizens’, ‘elders’, and ‘elderly’ have been used interchangeably in  
562 academic literature, medical reports and media to refer to people aged 60 and over. Since 1995 the  
563 United Nations Committee on Economic, Social and Cultural Rights has advocated for the use of  
564 the term ‘older persons’. Similarly, in an effort to bring awareness to ageist language and attitudes,  
565 the International Longevity Centre (*Dahmen and Cozma, 2009*) issued a media guide  
566 recommending the use of ‘older adult’ or ‘older person’ over senior or elderly. Despite these  
567 attempts, the use of the term ‘elderly’ is still widespread. For instance, in a study of medical  
568 journals from 1996 to 2006, all used the term elderly; three of the four major geriatric journals

569 favoured the term elderly over older adults at a rate of 4:1 in contrast to general journals (*see*  
570 Quinlan and O’Neill, 2008). In our study, the search for the keyword ‘elderly’ retrieved 152,285  
571 tweets (*see* Table 1) which constitutes over 82 per cent of the collected data, reflecting the  
572 pervasive use of the term in both media and academia.

573 Like any other group, older adults are heterogeneous and thus using the term elderly can be ageist.  
574 Ageism is so embedded in our culture that unlike racism and sexism, it usually “goes unnoticed and  
575 unchallenged” (Wilkinson and Ferraro, 2002 cited in Macrae 2018: 240), and yet “[old] age is the  
576 only social category [...] that everyone may eventually join” (North and Fiske, 2012: 982). Since  
577 discourse is ‘language in use’ and although it is difficult to reach consensus on the terms we use, it is  
578 important to advocate for the use of respectful and sensitive terms, especially as our linguistic  
579 choices contribute to (re)produce wider social and political discourses that either empower or  
580 disempower older adults.

### 581 **Limitations and final thoughts**

582 There are some limitations to our study that should be addressed. The research is based on Twitter,  
583 the most popular microblogging service, however its adoption is not homogeneous worldwide  
584 (Mocanu *et al.*, 2013). For instance, in China Weibo prevails over Twitter. Moreover, while the use  
585 of Twitter among older people is increasing, it is mainly used by a young population (Sloan *et al.*,  
586 2015), so we might assume that the results show mainly young people’s perceptions about old age  
587 and older people. Descriptive information relating to the type of Twitter account (*e.g.* individual or  
588 organisational) as well as individuals’ personal information (*e.g.* age, gender, profession and  
589 geographic location) was not coded. Also, Twitter users can choose to make their accounts private  
590 so that only their approved followers can view their tweets. It is estimated that around five per cent  
591 of Twitter users set their accounts as private (Liu, Kliman-Silver and Mislove, 2014). Therefore,  
592 private tweets were not collected.

593 The extraction of tweets was therefore limited to a set of public tweets in English shared during a  
594 fixed period that included specific keywords. Whilst English was the dominant language in Twitter

595 in its beginning (Honeycutt and Herring, 2009), there has been an increase of tweets in other  
596 languages; between 2010 and 2013 tweets in English decreased from 83 per cent to 52 per cent (Liu  
597 *et al.*, 2014). For each of the four keywords (ageing, old age, older people, and elderly), we  
598 gathered tweets posted during one week in August 2016 that included those key terms within the  
599 main text of the tweet because in a previous exploratory analysis we detected that keywords as part  
600 of the text covered a greater variety of topics as opposed to trending hashtags that might be attached  
601 to particular cultural groups, events or periods of time. Another limitation is that the American  
602 spelling of ageing (*i.e.* aging) was not used, and thus future research should ensure that further  
603 consideration is given to international spelling variations.

604 The final random and relatively small sample that we analysed employing a systematic content and  
605 discourse analysis had to be sensibly manageable in order to apply human coding, which may be  
606 considered a limitation. However contextual sensitivity can only be achieved through the rigor of  
607 manual coding as computational automated analysis is not yet capable of capturing nuanced  
608 meanings present in tweets (*see* Kim *et al.*, 2018). These do not undermine our findings but are  
609 rather a reflection of the challenges of conducting social media content analyses. As social media  
610 analysis is challenging in terms of data volume and time sensitivity, future studies will benefit from  
611 finding ways to develop new approaches that combine social theories and computational automated  
612 techniques to enable accurate detection of topics and language nuances. Particularly considering  
613 our results, future research might contemplate a comparison of ageing and old age related content  
614 (*i.e.* topics and discourses) across different social media platforms (*e.g.* Twitter, Facebook).  
615 Another follow-up to our study would be the analysis of images shared on Twitter and even other  
616 platforms such as Instagram and Facebook in order to draw comparisons and similarities in content  
617 and user types (*see* Manikonda *et al.*, 2016).

618 In this paper we have shown how the discourses and representations of ageing and older adults in  
619 Twitter reflect the dominant discourses of traditional media. Counter-discourses that *embrace*  
620 *ageing*, on the other hand, were rarely found. As opposed to traditional media (magazines, TV),

621 social media network audiences have a very clear and immediate way to communicate with each  
622 other as both consumers and creators of content, which represents an opportunity for key advocates  
623 and institutions to promote public engagement and influence the communication with counter-  
624 discourses that legitimise all forms of ageing and ageing bodies, challenge the discourses that  
625 dominate everyday exchanges in social media, and contribute to form more positive attitudes  
626 towards older adults.

627

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- 930

931 **Table 1.** Number of tweets collected and analysed for each keyword

<b>Keyword</b>	<b>Number of tweets collected</b>	<b>Number of tweets analysed</b>
old age	12,629	300
ageing	12,749	300
older people	7,595	300
elderly	152,285	300
<b>Total</b>	<b>185,258</b>	<b>1,200</b>

932

**Facet 1: Topic of the tweet.** This facet includes 12 categories, only one to be selected.

*Health and Social Care* (e.g. social care programmes; healthcare provision; policy-related issue; community services, care homes; hospital issues).

*Anti-ageing promotion* (e.g. ageing deemed as something to be avoided/disliked; anti-ageing products; praise of beauty and youth).

*Ageing population* (e.g. related to demographic trends; financial impact; pension issues; economic burden).

*Personal concerns/views* on ageing/old people, including derogative views.

*Age-friendly initiatives* (e.g. programmes to enable older adults to actively participate in their communities).

*Elder abuse/neglect/crime* (issues pertaining to both systematic abuse and one-time instances).

*Ageing workforce* (pertaining to older people entering or remaining in the workforce; work-life balance in the context of an ageing workforce).

*Intergenerational relations* (e.g. social exchange, teaching or help between generations; sharing or volunteering; support/care issues; living arrangements; concerns/expectations about your older/younger relatives, friends, neighbours).

*Older people, ICT and social media* (e.g. issues pertaining to older people and use of technology; comments on older adults' ability with ICT or social media).

*Appearance* (references to physical appearance, or expressions using age-related adjectives when describing someone).

*Language form and use* (e.g. exaggerated remarks, jokes in relation to age, ageing or older people).

*Other* (any other topic outside or irrelevant to the above categories).

**Facet 2: Sentiment of the tweet.** This facet includes 3 categories, only one to be selected.

*Positive sentiment*

*Neutral sentiment*

*Negative sentiment*

935 **Table 3.** Content analysis of a random sample of 1,200 tweets (300 tweets for each keyword).

Facets	Categories	Old age	Older people	Ageing	Elderly
Topic	1. Health & Social care	10.7%	31.0%	17.0%	19.7%
	2. Anti-ageing promotion	0.3%	0.0%	29.0%	0.3%
	3. Ageing population	4.3%	4.0%	13.7%	6.0%
	4. Personal concerns/views	52.7%	42.3%	23.0%	23.3%
	5. Age-friendly initiatives	0.3%	1.7%	0.3%	1.7%
	6. Elder abuse/neglect/crime	0.0%	3.3%	0.0%	17.3%
	7. Ageing workforce	0.0%	1.3%	1.3%	0.0%
	8. Intergenerational exchange	0.7%	5.3%	0.3%	10.0%
	9. Older people, ICT and social media	0.3%	6.7%	1.3%	0.3%
	10. Appearance	2.3%	0.7%	1.0%	11.7%
	11. Language form & use	17.3%	0.3%	5.3%	1.0%
	12. Other	11.0%	3.3%	7.7%	8.7%
Sentiment	Negative	33.1%	29.6%	15.4%	29.3%
	Neutral	29.8%	39.3%	56.8%	49.3%
	Positive	37.1%	31.1%	27.8%	21.3%

936

**Table 4.** Example tweets for each keyword from each of the topic categories

Topic	Old age	Older People	Ageing	Elderly	% of Tweets
<b>1. Health &amp; Social care</b>	Retirement housing that is not just an 'old age home	Volunteering benefits mental health of older people	A positive attitude towards ageing can increase life expectancy by up to 7.5 years	Few doctors make house calls to homebound elderly	<b>19.6%</b>
<b>2. Anti-ageing promotion</b>	Botox is gonna be my BFF when I'm 30. Gonna fight off old age like its WWII	N/A	The best antiageing and correcting product I've ever used for under £14	Extending the limits of reconstructive microsurgery in elderly patients	<b>7.4%</b>
<b>3. Ageing population</b>	Lib government went against the global trend by reversing policy to raise age for Old Age Security	Older people have saddled young with pension burden, says think tank	Rising #health costs due to ageing population? Reshape the health system	Raise public pension for elderly people. UK State Pension is among lowest in Europe	<b>7.0%</b>
<b>4. Personal concerns/views</b>	I used to be 6'6 tall, but I have shrunken 1 inch in my old age	These older people always speaking condescendingly to our generation	Terrible feeling when you notice yourself ageing when looking through photos from the last 2 years	Hate when an elderly person tells a joke and I don't get it. I just stand there and fake laugh	<b>35.3%</b>
<b>5. Age-friendly initiatives</b>	10 Tips For Making Your Home Old-Age Friendly	Designing for older people is designing for all #architecture #socialintegration	Funding the #Arts of Ageing.	Smart House for the Elderly using Raspberry Pi	<b>1.0%</b>
<b>6. Elder abuse/neglect/crime</b>	N/A	Older people at risk of financial abuse, warns Age UK	N/A	Fraudsters preying on elderly in phone scam	<b>5.2%</b>
<b>7. Ageing workforce</b>	N/A	Help older people into work - free training	A proactive approach to an ageing workforce	N/A	<b>0.7%</b>
<b>8. Intergenerational exchange</b>	My grandmother is like a mother to me and seeing her being half the woman she used to be is unbearably sad. Old age man	Working with older people has taught me so many lessons...	As a teenager during the late 70s I spent time with ageing Trotskyists. Very nice people, always happy to help	Need to listen to what my auntie told me earlier. words of wisdom do really come from the elderly	<b>4.1%</b>
<b>9. Older people, IT and social media</b>	At the grand old age of 62, I decided to find out what all the fuss was about Pokémon	Older people in USA becoming more tech-skilled	Great article in Spanish on games and ageing	How Technology Can Empower the Elderly	<b>2.2%</b>
<b>10. Appearance</b>	Met the hottest 38-year-old, old age is only a number	I thought she was 18 and I don't physically hurt older people but she was 14 !!	Have you got tech face? The weird ways your mobile device is ageing your skin	Need elderly female in LA area who smokes pot for a video, if you know a grandma or have suggestions dm me	<b>3.9%</b>
<b>11. Language form &amp; use</b>	brb while i die of old age waiting for suga to drop his mixtape	What's older people stuff?	#TechNews Digitally ageing out of the 25-34 cohort	All #seniorshelpingseniors candidates undergo Level 2 FBI background screenings #elderly #Broward #Florida	<b>6.0%</b>
<b>12. Other</b>	The Voyage of Life: Old Age, by American Thomas Cole. Canvas	Gold needs to stop wanting to date older people... Wasn't Red	#investigation #tarragon old age	Elderly Woman Behind The Counter by PEARL JAM	<b>7.7%</b>

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**Table 5.** Final discourse analysis framework

**Discourses identified in the sample (1,080 tweets)**

**Older adults' human rights** (N=334). Tweets that champion the interests and rights of older people and consider them as valued and deserving of respect, recognition of ageing population's contributions to society, calls to provide better health care and support, examples of advocacy and activism

**Anti-ageing culture** (N= 112). Tweets promoting or praising the use anti-ageing products/activities. Tweets praising youth and beauty – old age as undesirable

**Promotion of Active/Healthy ageing** (N= 102). Tweets pertaining to the promotion of activities, changes to lifestyle conducive of healthy and/or active ageing – also tweets that show an 'inspiring' image or vision of active/healthy old age or older people

**Decline** (N=92). Ageing/old age is constructed as inevitable decline, including loss and 'negative' changes; these can be biological, social, psychological, physical, or cognitive

**Othering (us/them)** (N=72). Tweets constructing older people as Other *e.g.* young/old; beautiful/ugly

**Rhetorical and literary figures** (N=98)

*Proverb or quotes about old age, ageing, older adults* (N=49)

*Hyperbole* (N= 49). Tweets presenting exaggerated statements or claims not meant to be taken literally

**Medicalisation of old age** (N= 36). Tweets that reduce ageing experience, old age or being an older person to something 'pathological', only treatable as a medical condition

**Old age as a Problem/Burden** (N=35). Tweets referring to old age as a burden for individuals or the economy; viability of the welfare state to cope with impact of demographic changes

**Undeserving old** (N=32). Tweets depicting older people are to blame, privileged, arrogant and so on

**Older adults as consumers** (N=23). Tweets that construct older people as a specific consumer segment of society

**Embracing old age** (N=20). Tweets that clearly ascribe to a positive and inclusive outlook on ageing and old age

**Other** (N=124). Anything that does not fit any category above

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