

Chen, I-Chi et al.

Article

A qualitative study of obesity perceptions in social media through Twitter's tweets

International Journal of Management, Economics and Social Sciences (IJMESS)

Provided in Cooperation with:

International Journal of Management, Economics and Social Sciences (IJMESS)

Suggested Citation: Chen, I-Chi et al. (2018) : A qualitative study of obesity perceptions in social media through Twitter's tweets, International Journal of Management, Economics and Social Sciences (IJMESS), ISSN 2304-1366, IJMESS International Publishers, Jersey City, NJ, Vol. 7, Iss. Special Issue, pp. 40-57

This Version is available at:

<https://hdl.handle.net/10419/176834>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<http://creativecommons.org/licenses/by-nc/3.0/>



A Qualitative Study of Obesity Perceptions in Social Media through Twitter's Tweets

* I-Chi Chen¹
Hui-Fuang Ng²
Li-Rou Chua³
Mun-Yee Loo³
Paik-Kei Wong³
Kim-Teng Chow³

¹Faculty of Business and Finance, Universiti Tunku Abdul Rahman, Kampar, Malaysia

²Faculty of Information and Communication Technology, Universiti Tunku Abdul Rahman, Kampar, Malaysia

³Department of Marketing, Faculty of Business and Finance, Universiti Tunku Abdul Rahman, Kampar, Malaysia

This qualitative study applied Q methodology to explore general public's perception, attitude and behavior toward obesity and overweight using Twitter's tweets. A total of 76 statements extracted from Twitter status updates mentioning 'obesity' and 'overweight' were selected as the Q-statements. Twenty-one participants attended the sorting process and completed the Q sorts. Factor analysis was then applied on the Q sorts to extract meaningful factors. Three significant factors emerged from a factor analysis of the Q sorts, including obesity stigmatization, causes of obesity, and positive attitude and sentiment toward obesity. The results reveal pervasive negative stereotypes, alienations, and negative attitude toward overweight and obesity. The findings suggest that social media can actually reinforce body satisfaction perception, self-efficacy and stained health behavior. Most importantly, obesity prevention at the individual level should focus on an individual's behavioral change and at the society level requires careful and comprehensive presentation of the issue to the public.

Keywords: Obesity, Social media, Health promotion, Qualitative methods, twitter

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have negative impacts on an individual's health, social, and financial outcomes (World Health Organization (WHO), 2016). In 2014, more than 1.9 billion adults aged 18 years and older in the world were overweight, among them over 600 million were obese (WHO, 2016). In addition, the WHO (2016) report indicates that 41 million of the world's children population under the age of five were overweight or obese in 2014. Obesity is not only a problem for the developed countries; in fact, the number of children in the developing countries who are overweight or obese is 30% higher than in the developed countries. The rate of obesity has tripled in

the developing countries over the past 20 years (Haidar and Cosman, 2011). In year 2010 alone, three to four million people died from obesity (Jacobs, 2014). Therefore, obesity and overweight are becoming serious issues for many countries today. Obesity and overweight are preventable health issues; the public, government and health provider should take serious action regarding this trend.

Cause and Consequence of Obesity and Overweight

Obesity is considered to be a multifactorial condition in which both environmental factors and genetic factors play a part. Leptin, also referred to as the obesity hormone, has been linked to obesity phenotype in humans (Galletta, 2016). The increase in obesity prevalence over the last decades has also been attributed to suboptimal macronutrient diet composition and insufficient physical activities (Tremblay and Lachance, 2017). Lack of physical activities and exercise will lead to obesity and overweight. Additionally, food advertising will influence food preference and eating behavior (Tarabashkina *et al.*, 2016; Neyens and Smits, 2016). Furthermore, sleeping habits and amount of sleeping time are also significant predictors of increased risk of adult obesity (Landhuis *et al.*, 2008).

Obesity is a complex chronic disease that has become a major public health problem in many countries throughout the world because of its high prevalence, causal relationship with many serious medical illnesses, adverse effects on quality-of-life, and marked economic consequences related to increased health care costs (Berthoud and Klein, 2017). A Health Survey from England in year 2013 indicated that people's Body Mass Index (BMI) over 30 will reduce about three years of lifetime whereas people over BMI 40 will reduce about eight to ten years of lifetime (National Health Service Choices, 2015). In addition, overweight children and teenagers have poorer self-image and lower self-esteem than normal weight. These situations will lead them to become cowardly and allow others to abuse them (Aparicio *et al.*, 2016). Social problems faced by overweight people are bullying and isolation during middle adolescence (Kaltiala-Heino *et al.*, 2016). Also, people who are depressed and anxious may be associated with obesity within individuals and families (Marmorstein and Iacono, 2016).

Social Media and Twitter Usage on Health Promotion and Education

Health promotion and education is the science and art of engaging people in actions that can help to optimize their health (O' Donnell, 1989). Health promotion and education emphasizes physical,

psychological and society to generate ways that help people to avoid health issues such as obesity (Becker *et al.*, 2015). Social media has become an effective approach in increasing participation within the community and it is actively being used in promoting health-related matters. Social media interventions were effective in youth, older adults, low socioeconomic status, and rural area populations at risk for disadvantage which indicate that these interventions may be effective for promoting health equity (Welch *et al.*, 2016), sexual health promotion intervention (Gold *et al.*, 2012) and psychological disease monitoring (Reavley and Pikington, 2014). Social media is a platform that comprises online communication tools to support and facilitate social connections between users (Hansen *et al.*, 2010). Currently, over 2.1 billion online users have active social media accounts (Walters, 2016). The utilization and propagation of social media have grown up at the rate that other forms of media were unable to compare with. Popular social media platforms include Twitter, Facebook, Instagram, and YouTube.

Twitter was launched in the year 2006 which allows users to interact with other users by sending short messages called *Tweets*. On average, around 313 million monthly active users, 1 billion unique visits monthly to the site with embedded Tweets (Twitter, 2017). To make the tweets being connected to general topics, Twitter users can put hashtags together with a keyword to their post. By default, tweets from all the users are publicly available and searchable. According to Effing *et al.* (2011), Twitter has grabbed a lot of research attention. Twitter has been used to study antibiotics usage (Scanfeld *et al.*, 2010), to monitor depression and schizophrenia (Reavley and Pikington, 2014), and to evaluate cancer patient support (Sugawara *et al.*, 2012).

The supportive online communities and organizations provide compassionate, non-judgmental and anonymous platform for individuals to share experiences and opinions. The social media networking has been used to enhance communication and to increase accessibility and interactivity among social media users (Smith and Lambert, 2014). With rapid diffusion, low cost and broad availability, social media has become increasingly prominent in health information dissemination and health promotion. About 23% of social media users reported following a friend's personal health updates, 15% received health information from the Web, 11% posted health-related information, and 9% joined health-related groups (Fox, 2011).

Overall, willingness and capacity to engage with the mass media such as social media were seen as essential attributes of influential public health researchers (Chapman *et al.*, 2014). This study intended to explore the perception, attitude, and health behavior of the general public toward obesity and overweight issues by using Twitter as the platform. Understanding people's opinions pertaining to the causes of and solutions for obesity can help health care practitioners, educators and government to design a more effective obesity prevention policy, and to improve the effectiveness of health education and promotion activities on social media.

METHODOLOGY

This study adopted a Q methodological approach to explore and describe people's perception, attitude and behavior toward obesity and overweight using Twitter updates or tweets. Typically, in a Q methodological study participants are presented with a sample of statements about some topics, called the Q sample. Respondents are then asked to rank-order (Q sorting) the statements from their individual point of view, mostly using a quasi-normal distribution. By Q sorting people give their subjective meaning to the statements, and by doing so reveal their subjective viewpoint or personal profile.

Q-methodology provides a scientific method for identifying perception structures that exist within certain individuals or groups (Yuen, 2005). According to Kim (1996), the focus of Q methodology is peoples' attitudes and perceptions that have been gained from personal experience. Q methodology is particularly suited for health-related inquiry concerned with the unconstrained expression of views (Dennis, 1986; Roger, 1991), especially in the study of attitude measurement within the field of health education and health promotion where subjective opinions are often sought, from laypersons and health professional to policymakers (Cross, 2005).

In this study, the procedure for performing Q methodological analysis comprises the following steps: (1) construct the Q sample; (2) select proper participants; (3) conduct Q sorting; and (4) perform data analysis.

-Q Sample

The Q sample consists of statements extracted from the Twitter updates pertaining to overweight or obesity. Q statements are self-referent statements made by a person in a social situation (Stephenson, 1953). To

collect the statements, first, a search was carried out on Twitter updates using keywords “Obesity”, “Obese” and “Overweight”. Data collection was performed in April 2015 on a daily basis. Upon completion, a total of 668 statements were in the concourse. After screening redundant and ambiguous statements, the number of statements reduced to 550. Next, experts familiar with Q methodology and obesity were invited to perform data categorization on the statements. Statements with the highest tweets and favorites in each category were selected for inclusion in the Q sample as they represent the current popular issues. Since the statements were grouped according to factors, it helps to overcome bias and preference in selecting statements (Paige and Morin, 2016). Generally, the number of Q-statements ranges from 20 to 100 (Dennis, 1986). The final structured Q sample contained 76 statements, covering the breadth and depth of the concourse. Lastly, selected statements were further edited for readability and clarity by the experts. The complete Q statements are presented in Appendix-IV.

-Selection of Participants

One of the most salient characteristics of Q-methodology is the use of a small sample, which is possible because intra-individual difference rather than inter-individual difference are considered significant (Yuen, 2005). Young adults are selected due to the rising number of these individuals participating in social media (Pew Research Center, 2015; Baumgartner and Morris, 2010).

A total of 21 participants were interviewed in this study. All participants are social media users. Aspects covered in the demographic profile include age, gender, race, education level, occupation, and Twitter account status. The majority of participants are aged between 21 to 30 years old (71.4%). More than half of all participants are female (61.9%) and Chinese (80.9%). In terms of education, about half of the participants hold a diploma or a college degree (52.4%). Meanwhile, about 42.9% of the participants are working adult, followed by students (38.1%). Lastly, only 3 of the 21 (14.3%) participants are frequent Twitter users.

The interviews were conducted between 1 June 2015 and 18 June 2015 in Malaysia. 7 respondents were interviewed through Skype and 14 respondents completed the Q-sorting through e-mail and mobile messaging Apps. All respondents completed the sorting process within 90 minutes to 2 hours. Before the

interview, participants received the information of Q-sample, Q-sort diagram and instructions of interview detail. The instruction and guideline provide three language settings, including English, Chinese, and Malay.

-Q Sorting

Q sorting involves the opinions or perceptions of the participants on an issue or matter. In the initial sort, participants were asked to categorize all the 76 statements into agree, disagree, and neutral. In the second sort, the 76 statements were sorted relative to one another on the Q-sort table. The Q-sort table is a quasi-normal distribution with a fixed number of statements placed under each scale point as shown in Table 1. The rating scale at the top row of the Q-sort table ranges from -5 to +5. The participants must adhere to the number of statements provided in the Q-sort table. The use of forced-choice is to allow participants to compare each statement with one another and use their personal viewpoints to place statements on the Q-sort table as they see fit. In such case, statements are examined in a relative sense instead of isolation. Finally, the resultant Q sort would be a matrix representing the participant's operant subjectivity on the issue under consideration.

| | Most disagree | | | | Neutral | | | | Most agree | | |
|-----------------------------------|---------------|----|----|----|---------|----|---|---|------------|---|---|
| Scale | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| Number of statements (Total = 76) | 3 | 5 | 7 | 8 | 9 | 12 | 9 | 8 | 7 | 5 | 3 |

Table 1. Distribution of Q Samples

-Data Analysis

The analysis of the Q sorts includes calculation of the correlation matrix of all Q sorts, performing factor analysis to identify the number of significant factors among the Q sorts, computation of factor scores (Z-scores), and ranking of factors. PQMethod 2.35 was used to carry out the above analysis. Principle component factor analysis in PQMethod yields the eigenvalues of the Q factors. Factors with eigenvalues more than 1.00 are extracted. Those with less than this amount are regarded as insignificant and generally of too little interest to warrant further investigation. The interpretation of Q factors and Z-scores focused on

specific statements that were defined as distinguishing statements. A distinguishing statement is when a statement's score on two factors is higher than the difference scores (McKeown and Thomas, 2013).

RESULTS

Analysis of the Q-sort data provided by the 21 participants revealed distinct attitude, perception, and behavior toward obesity among participants. Three significant factors related to obesity issue were identified. As shown in Table 2, the three factors, expressed as Factor I, II, and III respectively, explained 52% of the total variance and their composite reliabilities range from 0.889 to 0.923. Correlations between the factors are all less than 0.5, ranging from -0.034 to 0.350, indicating that the factors are more distinct than alike. In addition, the salient statements that are used to interpret the three factors can be identified through factor scores. The followings discuss the characteristic statements associated with the three factors. For ease of interpretation, this study has followed common Q methodological practice to provide each factor with a theme.

| | Factor I | Factor II | Factor III |
|------------------------|-----------------|------------------|-------------------|
| Composite Reliability | 0.889 | 0.923 | 0.889 |
| Eigenvalues | 6.354 | 1.226 | 1.010 |
| % Explanation Variance | 25 | 15 | 12 |
| Correlation analysis | | | |
| Factor 1 | 1.000 | | |
| Factor 2 | 0.350 | 1.000 | |
| Factor 3 | -0.034 | 0.095 | 1.000 |

Table 2. Factor Summary

Factor I: Obesity Stigmatization on Twitter

There were ten (47.6%) participants classified as factor I. The statements associated with Factor I that participants most positively agreed and disagreed with are listed in Table 3 (see Appendix-I). Apparently, participants in factor I agree that overweight is unhealthy (item 23) and that obesity is harmful and might cause mental and physical issues (items 27 and 36). Besides, factor I participants feel annoyed towards obese people who feel comfortable with obesity (item 20) and they believe "plus-size models" should not be publicized (items 32 and 6). At the same time, participants within this factor highly disagree that looking

healthy means looking fat and looking normal means looking obese (item 7). In contrast, they believe obese people should make a change towards a more healthy body figure (item 15). Consequently, factor I identifies pervasive negative stereotypes, alienations, and negative attitude toward overweight and obese people.

Factor II: Causes of Obesity

A total of seven (33.3%) participants loaded significantly on factor II. As shown in Table 4 (see Appendix-II), participants in factor II strongly agree that bad diet leads to overweight or obesity rather than lack of exercise (item 63) and disagree that obesity is a rich people problem (item 54). Participants in this factor also think that obesity can also be caused by higher level of stress (item 48) and eating disorders (item 70). As a number of statements regarding causes are being highlighted in factor II, thus, factor II is characterized by the causes of obesity.

Overall, participants in factor II agree that maintaining a healthy diet is a personal business (item 23) instead of attributing the cause to the commercial activities of the fast food companies (item 29). In addition, a consensus among these participants is that calling obesity a disease (item 1) or attacking overweight people (items 43 and 37) will not help obese people to lose weights and make healthy choices.

Factor III: Positive Attitude and Sentiment toward Obesity

There were four (19.0%) participants classified as factor III. Refer to Table 5 (see Appendix-III) for the statements with which they most agreed and disagreed. Factor III reveals discourse of encouragement and acceptance for individuals with overweight and obesity issue. The “love your body” movement is being accepted and favored by the factor III participants but they stress that the people who are extremely underweight or overweight should not be glorified (item 51). In the meantime, they highly disagree that being obese is as dangerous as being anorexic and believe that one of these serious issues is not protected via “anti-shaming” and “body positivity” (item 4). Besides, these participants are totally against fat shaming but are aware that it is not great to be obese or overweight (item 35). Meanwhile, the participants feel very motivated when seeing an overweight person is working hard in the gym (item 53). Overall, the participants in factor III have a more positive attitude and sentiment toward obesity.

This study applied a qualitative approach to explore general public's perception, attitude, and health behavior toward obesity and overweight using Twitter's tweets and Q methodology. Three factors exemplify people's subjective opinions on obesity issues were identified, namely obesity stigmatization, causes of obesity, and positive attitude and sentiment toward obesity.

The obesity stigmatization factor reveals that there is a common perception of obesity being unhealthy or even obese people are not beautiful. Observation on tweets related to overweight and obesity shows negative sentiment usually extends to verbal aggression and insults. According to Park (2015), the Tweets on Twitter negativity had a significant effect on anger and disgust. This factor is supported by the study of (Brewis *et al.*, 2011) who reported that a rapid globalization of fat stigma where obese people are increasingly viewed as ugly, undesirable, lazy, or lacking in self-control. Obesity or weight stigma may trigger unhealthy dietary behavior and cause psychological issues such as body dissatisfaction, low self-esteem, or the pursuit of thinness (Pearl *et al.*, 2015). According to Pearl *et al.* (2015), for individuals who had previously experienced weight stigma, media exposure can trigger the intentions and self-reported behavior shortly and at the same time may contribute to worse psychological functioning and physical activity. The result signifies that shaping people's health behavior should start with reducing obesity stigmatization.

Participants who ascribed to factor II are largely concerned about the potential causes of obesity. Participants in this factor believe that the major causes of obesity are due to unbalance and unhealthy diet and health condition instead of lack of physical activities, and that maintaining a healthy diet is essentially a personal issue. According to Foster-Schubert *et al.* (2012), lifestyle-change program, incorporating either combined or separate dietary weight loss or moderate exercise intervention produced significant reductions in body weight. However, Carroll (2015) mentioned that physical activities might not be the key determinant of unhealthy weight in children. Although it is generally true that bad diet and overeating are the major factors of obesity, recent literature has revealed that other environmental factors such as media and food advertising also contribute to positive energy balance that underlies body-weight gain and should be considered in order to tackle obesity (Tremblay and Lachance, 2017). In addition, it seems that genetic inheritance is another important factor that has been overlooked. The results show that most people do not fully understand the causes and consequence of obesity. The public nowadays gravitates toward social

media for health information and treatments. Disseminating accurate information regarding overweight and obesity can actually help people to take the proper action to tackle the problem.

The third factor, positive attitude and sentiment towards obesity, demonstrates a more positive look at obesity. This finding is congruent with the U.S. government health survey conducted from 1988 through 2014 which shown that socially accepted normal body weight is shifting toward heavier weight (USA Today, 2017). The positive portrayals and information can significantly influence public attitudes on obesity. According to our research finding, a supportive environment can enhance health and lower health disparities. Both factors I and III are pertaining to attitude yet these two factors differ in the ways of perceiving obesity. Nevertheless, both factors recognize that being obese is unhealthy.

It is interesting to note that obesity prevention and the related behavior change did not emerge as significant factors. Most of the collected tweets did not mention weight-related behavior change or obesity prevention and consequence (see Appendix-IV). This indicates that most people might not have enough knowledge regarding obesity prevention and the potential detrimental effects of obesity. Previous research also found that social media interventions to promote healthy diet and exercise did not associate significantly with differences in weight loss or physical activity (Williams *et al.*, 2014). It should note that factors I and III merely recognize obesity is a problem or unhealthy, but more specific negative impacts of obesity have not been identified. Sun *et al.* (2016) recommend raising awareness of obesity as a societal issue and mobilizing collective efforts. In brief, messages regarding behavior change towards a healthier lifestyle, prevention and detrimental effects of obesity are not gaining great attention on social media which make these factors insignificant.

CONCLUSION

This study identified three different perceptions of obesity by the general public: obesity stigmatization, causes of obesity, and positive attitude and sentiment toward obesity. The findings of this study provide several implications for health care practitioners and health promotion researchers. First, the obesity stigmatization or negative sentiment that dominates the conversations related to obesity should be prevented since lower self-esteem of obese people will only worsen the obesity epidemic. Health promotion and

education campaigns could increase participation within the community to provide positive messages or stories, especially from influential individuals, about obesity on social media in order to educate the people who have possessed such a negative attitude. It is known that tweets which gain plenty of attention are attributed to public figures and celebrities instead of the attractiveness of the content. With the spreading of positive messages on social media, there is a greater chance for the public to understand the effect of social media discourse on obesity and even take actions such as practicing healthy lifestyles.

Second, anonymity allows Twitter users to feel more comfortable sharing sensitive information and personal opinions. Social media such as Twitter has the opportunity to overcome the culture, language, location, social class, and other obstacles to interpersonal communication on obesity issues. Health care providers and policymakers can consider the impact of health care intervention and education that can be performed via open public social media or via private networks, based on the different information and knowledge to deliver the proper messages to the public. Third, the study showed that only dietary habit and health condition are the factors that the public most aware of. As a consequence, health promotion programs should emphasize the causes of obesity which have been overlooked on social media. Lastly, the results indicated that behavior change and the effects and prevention of obesity issues are not well addressed by social media users. Therefore, health care providers should emphasize more about the seriousness of getting obesity, the ways to prevent becoming obese, as well as the benefits to get rid of obesity.

This research demonstrates a different approach from other past studies which is to implement a qualitative approach to investigate the people's opinions toward obesity. The Q methodology and PQMethod address a key issue facing obesity prevention, public attitude and perception about the issue as expressed on the Twitter channel. Hence, this research can be useful for health promotion researchers who have not benefited from a qualitative inquiry. The present study collected opinions of public on obesity issues via Twitter's tweets. It is not possible at the moment to systematically expose all Twitter users. Consider the heterogeneity of social media users may make understanding of the benefit of social media challenging. For further study, extending the observation period can enhance a better understand of social opinions regarding obesity.

REFERENCES

- Aparicio, E., Canals, J., Arija, V., De Henauw, S. and Michels, N. (2016), " The role of emotion regulation in childhood obesity: implications for prevention and treatment" , *Nutrition Research* review, Vol. 29 No.1, pp. 17-29.
- Baumgartner, J.S. and Morris, J.C. (2010), " MyFace tube politics: social networking web sites and political engagement of young adults" , *Social Science Computer Review*, Vol. 28 No.1, pp. 24-44.
- Becker, C.M., Glascoff, M.A., Felts, W.M. and Kent, C. (2015), " Adapting and using quality management method to improve health promotion" , *Explore*, Vol. 11 No. 3, pp. 222-228.
- Berthoud, H.R. and Klein, S. (2017), " Advances in obesity: causes, consequences, and therapy" , *Gastroenterology*, Vol. 152 No. 7, pp. 1635-1637.
- Brewis, A., Wutich, A., Falletta-Cowden, A. and Rodriguez-Soto, I. (2011), " Body norms and fat stigma in global perspective" , *Current Anthropology*, Vol. 52 No.2, pp. 269-276.
- Carroll, A.E. (2015), " To weight loss, eating less is far more important than exercising more " , available at <https://www.nytimes.com/2015/06/16/upshot/to-lose-weight-eating-less-is-far-more-important-than-exercising-more.html> (accessed 22 September 2017).
- Chapman, S., Haynes, A., Derrick, G., Sturk, H., Hall, W.D. and St.George, A. (2014), " Reaching ' An audience that you would never dream of speaking to ' : influential public health researchers' views on the role of new media in influencing policy and public understanding" , *Journal of Health Communication*, Vol. 19 No.2, pp. 260-273.
- Cross, R.M. (2005), " Exploring attitudes: the case for Q methodology" , *Health Education Research: Theory & Practice*, Vol. 20 No. 2, pp. 206-213.
- Dennis, K. E. (1986), " Q-methodology: relevance and application to nursing research" , *Advances in Nursing Science*, Vol. 8 No.3, pp. 6-17.
- Effing, R., Hillegersberg, J. and Huibers, T. (2011), " Social media and political participation: are facebook, twitter and YouTube democratizing our political systems?" , *International conference on Electronic Participation*, epart 2011, pp. 25-35.
- Foster-Schubert, K.E., Alfano, C.M., Duggan,C.R., Xiao, L., Campbell, K.L., Kong, A., Bain, C., Wang,C.Y., Blackburn, G. and McTiernan, A. (2012), " Effect of diet and exercise, alone or combined, on weight and body composition in overweight-to-obese post-menopausal women" , *Obesity*, Vol. 20 No. 8, pp. 1628-1638.
- Fox, S. (2011), " The Social Life of Health Information" , available at <http://www.pewinternet.org/2011/05/12/the-social-life-of-health-information-2011/> (accessed 12 May 2017).
- Galletta, G.M. 2016. " Obesity Symptoms, Causes, Treatment - What causes obesity? " , available at http://www.medicinenet.com/obesity_weight_loss/page3.htm (accessed 12 May 2017).
- Gold, J., Pedrana, A.E., Stooove, M.A., Chang, S., Howard, S., Asselin, J., Ilic, O., Batrouney, C., Hellard, M.E. (2012), " Developing health promotion interventions on social networking sites: recommendations from the FaceSpace project" , *Journal of Medical Internal Research*, Vol. 14 No.1: e30. doi: 10.2196/jmir.1875
- Haidar, Y. M. and Cosman, B.C. (2011), " Obesity epidemiology" , *Clinics in Colon Rectal Surgery*, Vol. 24 No. 4, pp. 205-10.
- Hansen, D., Shneiderman, B. and Smith, M.A. (2010), *Analyzing Social Media Networks with NodeXL: Insights from a Connected World*, Morgan Kaufmann, Burlington, MA.
- Jacobs, H. (2014), " The 10 Fattest Countries in the World" , *Business Insider*, available at <http://www.businessinsider.my/the-10-fattest-countries-in-the-world-2014-11/?r=US&IR=T#yccvglC4VuyixtoV.97> (accessed 12 May 2017)
- Kaltiala-Heino, R., Lankinen, V.,Martunen, M., Lindberg, N. and Fröjd, S. (2016), " Overweight, perceived overweight and involvement in bullying in middle adolescence" , *Child Abuse & Neglect*, Vol. 54, pp. 32-42.
- Kim, H.K. (1996), " Utility of Q-methodology" , *Journal of KSSSS*, Vol. 1, pp. 15-33.
- Landhuis, C.E., Poulton, R., Welch, D. and Hancox, R.J. (2008), " Childhood sleep time and long-term risk for obesity: a 32-year prospective birth cohort study" , *Pediatrics*, Vol. 122 No. 5, pp. 955-960.
- Marmorstein, N.R. and Iacono, W.G. (2016), " Associations between depression and obesity in parents and their late-adolescent offspring: a community-based study" , *Psychosomatic Medicine*, Vol. 78, No. 7, pp. 861-866.
- McKeown, B.F. and Thomas, D.B. (2013), *Q Methodology: Quantitative Applications in the Social Sciences* (2nd ed.), Sage Publisher, Thousand Oaks, CA.
- National Health Service Choices. (2015), " Britain: the fat man of Europe " , *NHS Choices*, available at <http://www.nhs.uk/livewell/loseweight/pages/statistics-and-causes-of-the-obesity-epidemic-in-the-uk.aspx> (accessed 12 May 2017).

- Neyens, N., and Smits, T. (2016), " Empty pledges: a content analysis of Belgian and Dutch child-targeting food websites" , *International Journal of Health Promotion and Education*, Vol. 55 No.1, pp. 42-52.
- O' Donnell, M. P. (1989), " Definition of health promotion: part 3: expanding the definition" , *American Journal of Health Promotion*, Vol. 3 No. 3, p.5.
- Paige, J. B. and Morin, K.H. (2016), " Q-sample construction: a critical step for a Q-methodological study" , *Western Journal of Nursing Research*, Vol. 38 No. 1, pp. 96-110.
- Park, C.S. (2015), " Applying ' Negativity Bias' to Twitter: Negative News on Twitter, Emotions, and Political Learning" , *International Journal of Health Promotion and Education*, Vol. 12 No. 4, pp. 342-359.
- Pearl, R.L., Dovidio, J.F., Puhl, R.M. and Brownell, K.D. (2015), " Exposure to weight-stigmatizing media: effects on exercise intentions, motivation and behaviour" , *Journal of Health Communication*, Vol. 20 No.9, pp. 1004-1013.
- Pew Research Center. (2015), " Social Media Usage: 2005-2015 " , *Pew Research Center*, available at <http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/> (accessed 12 May 2017).
- Reavley, N.J., and Pilkington, P.D. (2014), " Use of Twitter to monitor attitudes toward depression and schizophrenia: an exploratory study" , *Peer J* 2(e647). doi: 10.7717/peerj.647.
- Roger, R.S. (1991), *Explaining Health and Illness: An Exploration of Diversity*, Harvester/Wheatsheaf, London.
- Scanfeld, D., Scanfeld, V. and Larson, E.L. (2010), " Dissemination of health information through social networks: Twitter and antibiotics" , *American Journal of Infection Control*, Vol. 38 No. 3, pp. 182-188.
- Smith T. and Lambert, R. (2014), " A systematic review investigating the use of Twitter and Facebook in university-based healthcare education" , *Health Education*, Vol. 114 No. 5, pp.347-366.
- Stephenson, W. (1953), *The study of behaviour: Q-technique and its methodology*. University of Chicago Press, Chicago, IL.
- Sugawara, Y., Narimatsu, H., Hozawa, A., Shao, L., Otani, K. and A. Fukao, A. (2012), " Cancer patients on Twitter: a novel patient community on social media" , *BMC Research Note*, 5:699. doi: 10.1186/1756-0500-5-699
- Sun, Y., Krakow, M., John, K.K., Liu, M. and Weaver. J. (2016), " Framing obesity: how news frames shape attributions and behavioural response" , *Journal of Health Communication*, Vol. 21 No.2, pp. 139-147.
- Tremblay, A. and Lachance, É. (2017), " Tackling obesity at the community level by integrating healthy diet, movement and non-movement behaviours" , *Obesity Review*, Vol. 18 S1, pp. 82-87.
- Tarabashkina, L., Quester, P. and Crouch, R. (2016), " Food advertising, children' s food choices and obesity: interplay of cognitive defences and product evaluation: an experimental study" , *International Journal of Obesity* Vol. 40, pp. 581-586.
- Twitter (2017). " It' s what' s happening." *Twitter*, available at <https://about.twitter.com/company> (accessed 10 June 2017).
- USA Today (2017). " Has 'fat acceptance' contributed to the U.S. obesity problem? " , available at <https://www.usatoday.com/story/news/nation/2017/03/07/fat-acceptance-contributed-american-obesity-problem-scl/98855432/> (accessed 17 May 2017).
- Walters, K. 2016. " 125+ Essential Social Media Statistics Every Market Should Know " , available at <https://hootsuite.com/newsroom/press-releases/hootsuite-survey-highlights-importance-of-social-media-across-the-customer-journey> (accessed 12 May 2017).
- Welch, V., Petkovic, J., Pardo Pardo, J., Rader, T., and P. Tugwell, P. (2016), " Interactive social media interventions to promote health equity: an overview of reviews" , *Health Promotion and Chronic Disease Prevention in Canada*, Vol. 36 No.4, pp. 63-75.
- Williams, G., Hamm, M.P., Shulhan, J., Vandermeer, B. and Hartling, L. (2014), " Social media interventions for diet and exercise behaviours: a systematic review and meta-analysis of randomised controlled trails" , *BMJ Open*, Vol. 4 No. 2: e003926. doi: 10.1136/bmjopen-2013-003926.
- World Health Organization (WHO). (2016), " Obesity and overweight " , available at <http://www.who.int/mediacentre/factsheets/fs311/en/> (accessed 12 May 2017).
- Yuen, E. (2005), " Attitude of elderly Korean patients toward death and dying: an application of Q-methodology" , *International Journal of Nursing Studies*, Vol. 42 No. 8, pp.871-880.

| Item No. | Statement | Z -Score |
|----------|---|----------|
| 23 | Being overweight is unhealthy and it is your personal responsibility to do your best to become fit. Please do. | 2.041 |
| 18 | I mean we complain about the obesity rate but yet it's \$1 for a double cheeseburger and \$10 for a small portion of a healthy meal. | 1.897 |
| 36 | For now I think it's enough to just remind you that most severely obese people are struggling with mental issues as well as physical ones. | 1.825 |
| 27 | Fat is harmful and obesity should not be a badge of pride. | 1.705 |
| 32 | Being overweight is not healthy so I do not understand why people are arguing that 'plus size models' should be in the public eye. | 1.561 |
| 6 | Plus Size Appreciation is not promoting obesity. It's making people who are constantly put down feel good about themselves. | 1.489 |
| 20 | Obese people who glamorize their weight annoy me because it is unhealthy and when you are having a heart attack, you would not be loving your curves. | 1.489 |
| 15 | Make-up can't hide my obesity. Only starvation can remove my fat. I don't want to be looking at obesity in the mirror forever. I must change. | 1.417 |
| 54 | Obesity is a rich people problem. | -1.369 |
| 21 | Lack of sleep is putting children at risk of overweight and obesity. | -1.417 |
| 49 | A salon owner claims that obese staff ruined her business by sneaking out for takeaways. | -1.561 |
| 25 | If I was getting overweight or obese, and my friends were telling me "Rock it girl", "love yourself". I would get away from these friends. | -1.561 |
| 2 | Study identifies childhood obesity as a risk factor for dropping out of school. | -1.633 |
| 7 | You look healthy = You look fat; You're too skinny = You're doing it right; You look normal = You are obese. | -1.753 |
| 57 | The government were saying that, they might implement an obesity tax, as a scheme to battle obesity. | -1.969 |
| 11 | You see fat families? When the mum is obese. The dad is obese. And so are the kids? Sickening. They should be banned from public. | -2.041 |

Table 3. Descending Z-Scores of Salient Statements Associated with Factor I

Appendix-II

| Item No. | Statement | Z -Score |
|----------|--|----------|
| 1 | Calling obesity a disease causes obese people to be less motivated to lose weight and make healthy choices, according to a study. | 1.930 |
| 23 | Being overweight is unhealthy and it is your personal responsibility to do your best to become fit. Please do. | 1.915 |
| 63 | Obesity due to bad diet not lack of exercise. | 1.770 |
| 43 | No respect for people attacking overweight people at the gym who are trying to turn their life around. | 1.717 |
| 48 | Reduced stress level can help obese people to lose weight. | 1.485 |
| 70 | Eating disorders are not just extremely thin people. They can be overweight morbidly obese or a normal weight person. | 1.269 |
| 75 | I hate when I go shopping and I can't find sizes for overweight people, it's so difficult to find and when you find something it's horrible. | 1.163 |
| 29 | McDonald's targets children to ensure that future generations grow up obese and lethargic. | -1.414 |
| 76 | Watching too much television can cause kids to be overweight and obese. | -1.487 |
| 19 | If you make fun an overweight person working out at the gym I'll key your vehicle. | -1.574 |
| 2 | Study identifies childhood obesity as a risk factor for dropping out of school. | -1.860 |
| 25 | If I was getting overweight or obese, and my friends were telling me "Rock it girl", "love yourself". I would get away from these friends. | -2.002 |
| 54 | Obesity is a rich people problem. | -2.037 |
| 37 | Every time my dad sees an overweight person & says "Look at that fat fuxx." saves me from letting my weight get out of control. | -2.056 |
| 11 | You see fat families? When the mum is obese. The dad is obese. And so are the kids? Sickening. They should be banned from public. | -2.342 |

Table 4. Descending Z-Scores of Salient Statements Associated with Factor II

| Item No. | Statement | Z-Score |
|----------|---|---------|
| 23 | Being overweight is unhealthy and it is your personal responsibility to do your best to become fit. Please do. | 1.805 |
| 51 | I love this whole love your body movement, but if you are extremely under/overweight, it shouldn't be glorified. Like you're killing yourself. | 1.805 |
| 67 | Obesity is becoming a real problem in the United Kingdom. | 1.690 |
| 10 | When more people are dying from obesity than starvation, there is a big problem. | 1.628 |
| 43 | No respect for people attacking overweight people at the gym who are trying to turn their life around. | 1.628 |
| 53 | Seeing an overweight person working hard in the gym is very motivating for me. | 1.628 |
| 35 | I am totally against fat shaming, but do not tell people that it is great and okay to be obese or overweight. | 1.513 |
| 50 | One way to lose weight? Studies show obesity is lower in marijuana users than in non-users. | -1.452 |
| 4 | Being obese is as dangerous as being anorexic. Yet one of these serious issues is protected via "anti-shaming" and "body positivity". | -1.513 |
| 24 | People at a normal weight who believe they are fat have a much greater risk of becoming obese later in life. | -1.628 |
| 22 | Obese people may have lower dementia risk. | -1.628 |
| 8 | Several new studies add to a body of evidence that being overweight may have health benefits. | -1.628 |
| 15 | Make-up can't hide my obesity. Only starvation can remove my fat. I don't want to be looking at obesity in the mirror forever. I must change. | -1.805 |
| 74 | Overweight teen tries to defend himself: I have a slow metabolism. I'm a nervous eater. I'm related to Rubeus Hagrid (character in Harry Potter, who is a giant human). | -1.920 |
| 54 | Obesity is a rich people problem. | -1.920 |

Table 5. Descending Z-Scores of Salient Statements Associated with Factor III

| No. | Q Statement |
|-----|---|
| 1 | Calling obesity a disease causes obese people to be less motivated to lose weight and make healthy choices, according to a study. |
| 2 | Study identifies childhood obesity as a risk factor for dropping out of school. |
| 3 | Both ancient Egyptian and Greek medicine recognized obesity as a medical disorder. |
| 4 | Being obese is as dangerous as being anorexic. Yet one of these serious issues is protected via "anti-shaming" and "body positivity". |
| 5 | Foods that are high in nickel are linked to obesity in some women. |
| 6 | Plus Size Appreciation is not promoting obesity. It's making people who are constantly put down feel good about themselves. |
| 7 | You look healthy = You look fat; You're too skinny = You're doing it right; You look normal = You are obese. |
| 8 | Several new studies add to a body of evidence that being overweight may have health benefits. |
| 9 | Obesity is more heritable than schizophrenia, high blood pressure, and alcoholism. |
| 10 | When more people are dying from obesity than starvation, there is a big problem. |
| 11 | You see fat families? When the mum is obese. The dad is obese. And so are the kids? Sickening. They should be banned from public. |
| 12 | An anti-obesity law has passed in Japan. It's now illegal to be overweight or fat in Japan. |
| 13 | Training leg is painful especially when you are an overweight baby boomer. But I am going to do this. |
| 14 | Wealthier men have a higher rate of obesity than poor. Poor women have higher rate of obesity than wealthier women. |
| 15 | Make-up can't hide my obesity. Only starvation can remove my fat. I don't want to be looking at obesity in the mirror forever. I must change. |
| 16 | Overweight type-2 diabetes patients outlive thinner ones, study says. |
| 17 | Teenagers who misperceive their weight as overweight are actually more likely to overeat compared to teenagers who accurately perceive their weight. |
| 18 | I mean we complain about the obesity rate but yet it's \$1 for a double cheeseburger and \$10 for a small portion of a healthy meal. |
| 19 | If you make fun an overweight person working out at the gym I'll key your vehicle. |
| 20 | Obese people who glamorize their weight annoy me because it is unhealthy and when you are having a heart attack, you would not be loving your curves. |
| 21 | Lack of sleep is putting children at risk of overweight and obesity. |
| 22 | Obese people may have lower dementia risk. |
| 23 | Being overweight is unhealthy and it is your personal responsibility to do your best to become fit. Please do. |
| 24 | People at a normal weight who believe they are fat have a much greater risk of becoming obese later in life. |
| 25 | If I was getting overweight or obese, and my friends were telling me "Rock it girl", "love yourself". I would get away from these friends. |
| 26 | Eating micronutrient or fiber-rich bar two times per day increase metabolism and decrease inflammation in obese people without diet change. |
| 27 | Fat is harmful and obesity should not be a badge of pride. |
| 28 | I'm apparently overweight but I look good? Strange. |
| No. | Q Statement |
| 29 | McDonald's targets children to ensure that future generations grow up obese and lethargic. |
| 30 | I can say this because I was obese. I've been there and made all the excuses! Stop mollycoddling people & promote healthy lifestyle change! |
| 31 | Dr. Allen Litcher: "Obesity will likely surpass smoking as the leading preventable cause of cancer." |
| 32 | Being overweight is not healthy so I do not understand why people are arguing that 'plus size models' should be in the public eye. |
| 33 | Stop promoting being morbidly obese as beautiful. You wouldn't do it with anorexia, it's not beautiful. It's a death sentence. |
| 34 | Hyperinsulinemia drives diet-induced obesity independently of brain insulin production. |
| 35 | I am totally against fat shaming, but do not tell people that it is great and okay to be obese or overweight. |
| 36 | For now I think it's enough to just remind you that most severely obese people are struggling with mental issues as well as physical ones. |
| 37 | Every time my dad sees an overweight person & says "Look at that fat fuxx." saves me from letting my weight get out of control. |

- 38 I despise parents who say that it is not their fault that their child is overweight.
39 Studies suggest standing more could lower risk for obesity, illness, and death.
40 15 minutes of laughter everyday can help reduce your risk of obesity and boost your metabolism.
41 4 out of 5 firefighters in US are overweight or obese, and about half of firefighters killed in the line of duty
suffer heart attacks.
42 Important reminder: not every overweight person dislikes their body and wants it to change!!! Do not project
societal standards on us!!!
43 No respect for people attacking overweight people at the gym who are trying to turn their life around.
44 I was once obese. Trust me, you're lying to yourself if you have the 'as long as I'm happy' mentality to
justify your condition.
45 I'm: So stressed. So depressed. So obese. So exhausted. So fat. So ugly. So worthless. So unwanted. So
disappointing. So disgusting.
46 1-4 children in America are obese, but please keep telling me how bad cutting weight is for my body.
47 I'm sorry but the people who embrace obesity only do so because they're too lazy to fix it.
48 Reduced stress level can help obese people to lose weight.
49 A salon owner claims that obese staff ruined her business by sneaking out for takeaways.
50 One way to lose weight? Studies show obesity is lower in marijuana users than in non-users.
51 I love this whole love your body movement, but if you are extremely under/overweight, it shouldn't be
glorified. Like you're killing yourself.
52 Pizza Hut offers free pizza to everyone called Charlotte this weekend, as a token of their devotion to
childhood obesity.
53 Seeing an overweight person working hard in the gym is very motivating for me.
54 Obesity is a rich people problem.
55 Standing desks are coming to schools, to cure obesity and increase attention spans.
56 Physical inactivity is a bigger risk factor for early death than "Smokadiabesity" (smoking, diabetes and
obesity together).

| No. | Q Statement |
|-----|--|
| 57 | The government were saying that, they might implement an obesity tax, as a scheme to battle obesity. |
| 58 | A new study shows many overweight people have a distorted self-image. They tell themselves, I'm not fat. I'm just easy to see. |
| 59 | Everyone is getting skinny and I am getting obese. |
| 60 | Parents rarely spot child obesity. |
| 61 | I am overweight and this is nothing but facts. We should not promote unhealthy lifestyles. |
| 62 | I used to tell myself I'm naturally overweight, I'm naturally big boned. But there are no fat people. Take Action! |
| 63 | Obesity due to bad diet not lack of exercise. |
| 64 | You think I haven't tried to lose weight? Ask most overweight women and they have tried it is not as black and white as you may think. |
| 65 | Overweight prevalence of pre-school children in ASEAN. It is alarming!!! |
| 66 | I've met a few people who say they don't like the taste of water. They were all obese. I assume it's correlated. |
| 67 | Obesity is becoming a real problem in the United Kingdom. |
| 68 | I was overweight but when I started doing gymnastics, I lost weight and I am not that skinny but confident. |
| 69 | Obesity is a frequently overlooked factor that can contribute to an increased cancer risk. |
| 70 | Eating disorders are not just extremely thin people. They can be overweight morbidly obese or a normal weight person. |
| 71. | Being the highest percentage of obese people in South East Asia is not helping in our progress for a better Malaysia. Pondering times. |
| 72. | For each hour of sleep lost, the odds of an adolescent being obese rise by 80%. |
| 73 | I admire an overweight person in the gym trying to get right. I was once there, my friends. |
| 74 | Overweight teen tries to defend himself: I have a slow metabolism. I'm a nervous eater. I'm related to Rubeus Hagrid (character in Harry Potter, who is a giant human). |
| 75 | I hate when I go shopping and I can't find sizes for overweight people, it's so difficult to find and when you find something it's horrible. |
| 76 | Watching too much television can cause kids to be overweight and obese. |
