Changing stigmatizing attitudes to mental health via education and contact with embodied conversational agents

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\textbf{A R T I C L E   I N F O}

Article history:
Received 20 December 2016
Received in revised form
17 March 2017
Accepted 22 March 2017
Available online 5 April 2017

Keywords:
Embodied conversational agents
Stigmatizing attitudes
Anorexia nervosa
Traditional stigma
Volitional stigma

\textbf{A B S T R A C T}

Educating society concerning stigmatized conditions, such as the eating disorder Anorexia Nervosa (AN), aims to change attitudes that will encourage individuals with AN to recognize their condition and decide to seek help. Embodied Conversational Agents (ECAs) may play an important role in bringing about changes in attitude and behavior because they potentially allow tailored but anonymous, free and convenient access and can deliver the information in a conversational way that overcomes health literacy barriers. In this first study we compare the use of an ECA with a video to deliver two strategies (education and contact) to address stigma around the mental health condition of Anorexia Nervosa (AN). Our results with 245 participants show that both media (ECA and video) aided recognition of AN and produced significant changes in positive volitional stigma and negative volitional stigma but not in traditional stigma (desire for social distance), with some notable differences based on gender. Baseline data was used in place of a control group and the sample population was undergraduate Psychology students due to higher incidences of AN in this population. Further validation is needed involving a control group and testing on populations other than Psychology students. Nevertheless, these initial results encourage our future work to build tailored ECAs to challenge particular beliefs to support a wide range of educational interventions to change behaviors and improve decision-making relating to health and wellbeing.

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1. Introduction

Embodied conversational agents (ECAs), computer-based humanlike characters designed to simulate face-to-face interactions, have been utilized in a variety of decision-making contexts in the health domain by providing support and education to patients and/or medical professionals or trainees (e.g. (Bickmore, Pfeifer, & Jack, 2009; Cordar et al., 2015; Halan, Sia, Crary, & Lok, 2015)). ECAs have been found to overcome barriers to accessing and effectively utilizing health information and treatment advice, by providing familiar face-to-face conversational style interactions (Bickmore et al., 2009) or by guiding application of the information in the decision-making process (Bickmore et al., 2015).

Our work is also focussed to a large extent on education, however, in contrast to these previous applications, our target users are not medical professionals or patients. Furthermore, our primary purpose of education is to challenge and change the opinions of the wider community to reduce stigmatizing attitudes towards these conditions. To this end, we seek to explore the value of ECAs in improving Mental Health Literacy (MHL). Jorm et al. (1997) define Mental Health Literacy as “knowledge and beliefs about mental disorders which aid their recognition, management or prevention” (p. 182). It is a multifaceted construct, however the following study will limit its scope to two key components - recognition of mental disorders, and stigmatizing attitudes towards those suffering from mental disorders [33]. In particular, we will focus on Mental Health Literacy regarding Anorexia Nervosa (MHL-AN).

Population surveys investigating MHL-AN have found that Anorexia Nervosa is often misidentified as something other than a legitimate psychiatric disorder (Darby, Hay, Mond, & Quirk, 2012). This misidentification may be the result of general naivety of the illness, however there is strong evidence to suggest that a third of the population hold stigmatizing attitudes towards Anorexia Nervosa and perceive it as a behavioral choice they are personally responsible for, rather than a serious mental illness (von dem Knesebeck et al., 2013). Stigma such as this is associated with a variety of negative health outcomes for individuals with mental...
illness (Jorm, 2012).

Past research has established that contact, face-to-face interactions with stigmatized individuals, as well as education, providing factual information to dispel disparaging stereotypes, are effective in improving MHL (Corrigan et al., 2001). These strategies have been evidenced to be effective in relation to direct human to human contact (e.g. group sessions, lectures) as well through indirect contact through media such as video presentations, and even through imagined contact with an outgroup member (Corrigan, Larson, Sells, Niessen, & Watson, 2007; Corrigan et al., 2001; Crisp, Gelder, Rix, Meltzer, & Rowlands, 2000). However, past research has not examined whether these effects are evident through simulated contact and education such as that provided by an ECA.

As a strategy to encourage individuals with AN to recognize their condition and seek medical support, we are looking at the role of an embodied conversation agent (ECA) to educate and change attitudes towards stigmatized conditions in society in general—targeting those not necessarily currently part of the support network of an individual with AN.

Our project aims to evaluate whether ECAs are effective in improving the mental health literacy (MHL) of undergraduate students regarding Anorexia Nervosa (AN). This population is likely to interact with individuals with AN since onset is usually around the age of 19 (Stice, Marti, & Rohde, 2013) and body dissatisfaction and eating disorders, including AN, are more prevalent in this cohort compared to the general community (Eisenberg, Nicklett, Roeder, & Kirz, 2011). Thus, evaluating strategies to improve perceptions of AN is valuable within this population, as university students are likely to interact with individuals experiencing AN. Specifically, we examine whether education or contact interventions, delivered by either ECAs or video presentations, generate improvements in Mental Health Literacy post-intervention compared to pre-intervention.

2. Literature review

ECAs have been used to help humans with physical health conditions including adherence to treatment or medication regimes, as interfaces to change dieting and exercise behaviors (Fox & Bailenson, 2009) and as tools to educate hospitalised patients about their illnesses (Bickmore, Schulman, & Sidner, 2013). Much of this work focuses around building a working alliance between the ECA and human patient/client (Bickmore, Gruber, & Picard, 2005), or providing motivation and reminders to carry out a health regime. Other ECA research is concerned with social, psychological or mental health conditions, such as bullying (Sapouna et al., 2010) or depression (Martínez-Miranda, Breso, & García-Gómez, 2014). In line with social learning theory, Cordar et al. (2015) showed that virtual humans could be used to model food behaviour. Fox and Bailenson (2009) found that a model of the self, exhibiting healthy behaviors, encouraged the human to duplicate such behaviors. Our study aims to challenge attitudes rather than changing behaviors or improving the user’s health.

Our study involves the use of two ECAs; one to present educational information about AN and another ECA who is a survivor of AN themselves (Gratwick-Sarll, 2011). One such social network is university students as eating pathology and prevalence rates of AN are higher among this population than the general public (Eisenberg et al., 2011). Yet, the capacity of this population to identify and refer persons with AN for treatment might be impaired as a significant proportion of university students do not recognize AN as a legitimate mental illness (Jorm, 2012).

According to the Diagnostic and Statistical Manual 5 (DSM-5), Anorexia Nervosa is an Eating and Feeding Disorder characterised by an inability to secure or maintain a healthy body-weight (Association, 2013). It is distinguished by three diagnostic criteria including: an intense fear of becoming overweight, disturbances in body-image, and persistent restrictive or compensatory dieting behaviors. Anorexia Nervosa (AN) is a clinically diagnosed mental disorder with severe medical consequences including organ failure, dermatological abnormalities, and gastrointestinal problems, which can be potentially life-threatening if left untreated (Arcelus, Mitchell, Wales, & Nielsen, 2011). Despite this, it is characteristic for individuals with AN to conceal or deny that they have a disorder (Vandereycken, 2006). This is concerning as the chances of recovery from AN worsen the longer treatment is delayed (Von Holle et al., 2008), and this denial likely contributes to the low rates of treatment-seeking observed among Anorexic individuals (Hart, Granillo, Jorm, & Paxton, 2011). Often it requires a friend or family member to detect the disorder, and subsequently refer individuals to seek help, before those with AN will acknowledge that they have a problem and accept treatment (Vandereycken, 2006). Therefore, researchers have suggested that engaging the social network of individuals with AN may be a useful strategy to facilitate early treatment seeking, rather than targeting the individuals with AN themselves (Gratwick-Sarll & Bentley, 2014).

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