

# The use of social media and the prevalence of depression: a multi-country examination of value co-creation and consumer well-being

Social media  
and the  
prevalence of  
depression

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David A. Griffith

*Marketing, Texas A&M University, College Station, Texas, USA*

Hannah Soobin Lee

*Marketing, Miami University, Oxford, Ohio, USA, and*

Goksel Yalcinkaya

*Marketing, University of New Hampshire, Durham, New Hampshire, USA*

## Abstract

**Purpose** – Social media is a product that is co-created by consumers and multinational enterprises, that partially manage the customer experience and that has garnered significant attention in the field of international marketing. However, international marketing scholars have yet to address the societal costs of the use of social media, even as academics in other disciplines and business leaders are raising alarm that social media has created a digital ecosystem that may harm individuals within the global market. The objective of this research is to examine the generalizability of the relationship between the use of social media and the prevalence of depression across countries.

**Design/methodology/approach** – Employing social cohesion theory and the social network approach of the strength of ties, this work examines the relationship between the use of social media and time spent on social media at the country level and the prevalence of depression. The authors examine this issue within a 28-country, eight-year, unbalanced panel dataset, accounting for cultural, economic and structural factors.

**Findings** – The authors find that as more people within a country use social media, the prevalence of depression in that country increases. However, the authors also find that as the average time spent on social media in a country increases the deleterious relationship between the use of social media and the prevalence of depression diminishes.

**Originality/value** – Answering the calls in the international marketing literature for a greater understanding of the externalities (i.e. consumer well-being effects) of marketing activities of multinational companies, this study demonstrates the varying relationships of the use of and time spent on social media and the prevalence of depression at the population level, across a wide variety of countries, thus also contributing to the effort to improving generalizations from multi-country comparisons in international research.

**Keywords** Use of social media, Time spent on social media, Prevalence of depression, Consumer well-being

**Paper type** Research paper

## 1. Introduction

Social media platforms (i.e. the web and mobile platforms that allow consumers to connect, or form “ties,” with others) create a virtual network where consumers can share, co-create or exchange various forms of digital content, including information, messages, photos or videos (Van Dijck, 2013). Social media is a product class that is co-created by consumers, firms that advertise and use the platform as an international vehicle for marketing, and the



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multinational social media companies behind the platforms that partially manage the customer experience (Akaka *et al.*, 2013; Sheth, 2020). The use of social media, defined as the share of a country's population with Internet users of any age who use a social network, has grown tremendously, currently connecting more than 3.8 billion people worldwide. While social media has enhanced connectivity and serves as a vehicle for global business transformation, scholars have become increasingly concerned that its use may also have deleterious effects on consumer well-being, such as on mental wellness (e.g. Appel *et al.*, 2016; Baker and Algorta, 2016; Keles *et al.*, 2020; Marino *et al.*, 2018; Seabrook *et al.*, 2016), causing harm to users, as well as increasing the burden on a country's healthcare system (WHO, 2017).

Central to the business model of multinational social media companies is increasing the total number of users. A greater number of users increases a social media company's market size, allowing it and its users to increase their return on marketing activities (Orlowski, 2020). Aligned with the goal of increasing market size is increasing users' time spent on social media, defined as the daily time spent on social media by a social media user within the country. Increasing user time spent on social media allows for increased marketing activities by and within each user market such that more ads can be served, there is greater opportunity for the spread of eWOM, increased contacts can be created, brand awareness can be further boosted, and increased spending in eCommerce can be achieved (Orlowski, 2020). However, the increasing use of social media within a country and time spent on social media by the average user may be a double-edged sword in terms of social cohesion, creating a potentially deleterious effect on society.

Understanding the potential double-edged sword of social media is important as one claimed outcome of the use of social media is an increase in depression (i.e. defined as mood disorders "characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration" (WHO, 2017)) (e.g. Appel *et al.*, 2016; Karim *et al.*, 2020; Keles *et al.*, 2020; Seabrook *et al.*, 2016; Twenge, 2020; Vidal *et al.*, 2020). Globally, it is estimated that 4.4% of the world population (more than 264 million people of all ages) suffers from depression, a major contributor to the overall global burden of disease (WHO, 2017). While depression has many causes, some scholars, nonprofit organizations and medical professionals argue that the use of social media is a significant influencer (e.g. Allcott *et al.*, 2020; Karim *et al.*, 2020; Keles *et al.*, 2020; Seabrook *et al.*, 2016; Twenge, 2020). Given the substantial societal burden attributable to depression and the increased use of social media globally, a comprehensive understanding of the use of social media's relationship with depression has important implications.

Unfortunately, although social media has become a central focus for marketing scholars (cf. Lambertson and Stephen, 2016; Li *et al.*, 2021; Okazaki and Taylor, 2013), researchers have yet to address its potential negative relationship with consumer well-being, or at a more societal level, the prevalence of depression (i.e. the percentage of a country's population experiencing depression) [1]. This gap in the international marketing literature is surprising given the importance of social media in society and the calls for a greater understanding of the externalities of international marketing activities (e.g. Carrigan *et al.*, 2005; Eteokleous *et al.*, 2016) (see Table 1).

Sheth (2020) further points to the research opportunity within the field of international marketing of the impact of public policy on the consumption of societally good products and practices [as well as the de-consumption of questionable ones (Kotler, 2018)]. Carrigan *et al.* (2005) argue that one can broaden the definition of "consumers" to include the wider stakeholder group of society as a whole, and thus it is the responsibility of marketers to generate value offerings that not only provide immediate customer satisfaction, but also protect the long-term welfare of consumers. Social media (i.e. the consumption of and value co-creation that occurs on such platforms), with a reach that permeates across country markets, is an important product class that has a significant influence on consumer

Study (Year)	Sample size	Design	Country	Social media type	Social media effect
Allcott <i>et al.</i> (2020)	<i>n</i> = 2,743	Randomized experiment	USA	Facebook	Detrimental
Banjanin <i>et al.</i> (2015)	<i>n</i> = 76	Cross-sectional	Serbia	Facebook	No effect
Blomfield Neira and Barber (2014)	<i>n</i> = 1,819	Cross-sectional	Australia	General	No effect
Brunborg and Andreas (2019)	<i>n</i> = 763	Longitudinal	Norway	General	Detrimental
Coyne <i>et al.</i> (2020)	<i>n</i> = 500	Longitudinal	USA	General	No effect
Cunningham <i>et al.</i> (2021)	<i>n</i> = 451,299	Meta-analysis	-	-	Detrimental
Datu <i>et al.</i> (2012) (Study 1)	<i>n</i> = 88	Cross-sectional	Philippines	Facebook	No effect
Davila <i>et al.</i> (2012)	<i>n</i> = 89	Cross-sectional	USA	General	Detrimental
Feinstein <i>et al.</i> (2013)	<i>n</i> = 150	Longitudinal	USA	Facebook	Detrimental
Frison and Eggermont (2016)	<i>n</i> = 160	Cross-sectional	Belgium	Facebook	Detrimental
Gámez-Guadix (2014)	<i>n</i> = 180	Longitudinal Cohort	Spain	General	Detrimental
Hanprathet <i>et al.</i> (2015)	<i>n</i> = 184	Cross-sectional	Thailand	Facebook	Detrimental
Huang (2017)	<i>n</i> = 19,652	Meta-analysis	-	-	Detrimental
Ivie <i>et al.</i> (2020)	<i>n</i> = 92,371	Meta-analysis	-	-	Detrimental
Jelenchick <i>et al.</i> (2013)	<i>n</i> = 190	Cross-sectional/ Experience Sampling	USA	Facebook	No effect
Jensen <i>et al.</i> (2019)	<i>n</i> = 388	Ecological Momentary assessment	USA	General	No effect
Kelly <i>et al.</i> (2018)	<i>n</i> = 204	Prospective cohort study	UK	General	Detrimental
Li <i>et al.</i> (2017)	<i>n</i> = 307	Cross-sectional	China	General	Detrimental
Lin <i>et al.</i> (2016)	<i>n</i> = 336	Cross-sectional	USA	General	Detrimental
Lup <i>et al.</i> (2015)	<i>n</i> = 365	Cross-sectional	USA	Instagram	Detrimental
Morin-Major <i>et al.</i> (2016)	<i>n</i> = 384	Longitudinal Cohort	Canada	Facebook	No effect
Nesi and Prinstein (2015)	<i>n</i> = 619	Cross-sectional	USA	General	Detrimental
O'Dea and Campbell (2011)	<i>n</i> = 663	Cross-sectional	Taiwan	General	Beneficial
Pantic <i>et al.</i> (2012)	<i>n</i> = 692	Cross-sectional	Serbia	General	Detrimental
Primack <i>et al.</i> (2021)	<i>n</i> = 1,289	Longitudinal Cohort	USA	General	Detrimental
Rosen <i>et al.</i> (2013)	<i>n</i> = 753	Cross-sectional	USA	Facebook	Detrimental
Selfhout <i>et al.</i> (2009)	<i>n</i> = 1,095	Longitudinal Cohort	Netherlands	General	Detrimental

(continued)

**Table 1.** Brief summary of studies on the social media-depression relationship

Study (Year)	Sample size	Design	Country	Social media type	Social media effect
<a href="#">Shensa et al. (2018)</a>	$n = 1,730$	Cross-sectional (cluster analysis)	USA	General	Detrimental
<a href="#">Simoncic et al. (2014)</a>	$n = 1,015$	Cross-sectional	USA	Facebook	No effect
<a href="#">Steers et al. (2014)</a>	$n = 1,143$	Experience sampling	USA	Facebook	Detrimental
<a href="#">Tandoc et al. (2015)</a>	$n = 1,589$	Cross-sectional	Singapore	Facebook	Detrimental
<a href="#">Thorisdottir et al. (2020)</a>	$n = 2,211$	Longitudinal Cohort	USA	General	Detrimental
<a href="#">Tiggemann and Slater (2015)</a>	$n = 1,781$	Cross-sectional	Australia	General	Detrimental
<a href="#">Tsitsika et al. (2014)</a>	$n = 2,099$	Cross-sectional	Greece, Spain, Poland, The Netherlands, Romania, Iceland	General	Detrimental
<a href="#">Van den Eijnden et al. (2008)</a>	$n = 3,657$	Longitudinal Cohort	Netherlands	Instant Messenger	Detrimental
<a href="#">Vernon et al. (2017)</a>	$n = 10,904$	Cohort	Australia	General	Detrimental
<a href="#">Wang et al. (2018)</a>	$n = 10,930$	Cross-sectional	China	General	Detrimental

Table 1.

well-being. Both academia and industry are recognizing the importance of understanding and responding to the externalities of international marketing activities [such as consumer well-being effects of advertising ([Stafford and Pounders, 2021](#))] as demonstrated by the plethora of research (albeit outside of the marketing field) on consumer well-being. [Appel et al. \(2020\)](#) suggest that much of the research on social media use and consumer well-being is limited and has produced mixed findings. They call for uncovering ways for social media platforms to encourage more meaningful connections and value co-creation, emphasizing the social responsibilities of multinational social media companies.

Building on this foundation, this study is framed by two research questions aimed to examine the generalizability of social media effects. First, *does the use of social media have a positive or negative association with the prevalence of depression?* Second, *does increased time spent on social media increase or decrease the association between the use of social media and the prevalence of depression?* We answer these questions using a dataset covering 28 countries over an eight-year time frame (2012–2019) [2], accounting for over 1.2 billion social media users (ranging from 43 million in 2012 to over 76 million in 2018). In answering these research questions, this work makes two important contributions to the international marketing literature.

First, studies examining the relationship between social media use and depression have resulted in mixed findings, with some finding social media use to increase depression and others finding no effect (cf. [Allcott et al., 2020](#); [Baker and Algorta, 2016](#); [Keles et al., 2020](#); [Marino et al., 2018](#)). Of further concern, these works are quite limited, as they have been conducted at the individual-level, primarily using small single-country samples (generally with adolescents), conducted with self-report measures via cross-sectional surveys, lab or field experiments, etc. As such, not only is there a lack of understanding of the relationship between the use of social media and depression, but more importantly of whether such a relationship exists at the population level, across global markets. We build a conceptual model on the sociological foundation of social network analysis and social cohesion, which

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frames the organization of social interactions within societies (Durkheim, 1893; Freeman, 2004; Granovetter, 1973; Scott, 1988; Zhang and Centola, 2019). Building on the argument of Van Dijck (2013) who notes that social media sites encourage weak tie development among users, we argue that the increased use of social media weakens social cohesion, resulting in a positive association between the use of social media and the prevalence of depression. Our results indicate a deleterious association between the use of social media in a country and the prevalence of depression experienced in that country, contributing to the effort to improve generalizations from multi-country comparisons in international research (Franke and Richey, 2010).

Second, we examine whether increased time spent on social media magnifies or mitigates the deleterious relationship between the use of social media and the prevalence of depression. We examine conflicting literature pertaining to the potential moderating effects under the auspices of social network interactions. The displacement hypothesis (cf., Lin, 1993; Twenge *et al.*, 2019) argues that increased time spent on social media displaces strong tie connections within society with weak tie connections. Under this hypothesis, one would expect time spent on social media to magnify the deleterious relationship between the use of social media and the prevalence of depression. Contrary to this perspective, Granovetter (1973) argues that increased engagement would increase tie strength. Under this hypothesis, increased time spent would increase tie strength, mitigating the deleterious relationship between the use of social media and the prevalence of depression. Our findings support the arguments of tie strength presented by Granovetter (1973) across global markets, advancing the international marketing literature by demonstrating that the deleterious association between the use of social media and the prevalence of depression is mitigated by time spent on social media universally.

We further note that these effects were observable within a framework that accounts for the measurable cultural, economic and structural factors, thereby isolating the relationship between the use of social media and time spent on social media on the prevalence of depression. The demonstration that the relationships of the use of, and time spent on, social media, and the prevalence of depression at the country-level provides new insights into the potential costs of social media on society, answering the calls for the study of externalities of marketing activities of multinational companies (e.g. Carrigan *et al.*, 2005; Eteokleous *et al.*, 2016).

## 2. Background literature and conceptual model

### 2.1 Social cohesion as a foundation of society

The abstract notion of society is conceptualized as the sum of relationships binding individuals together (Giddings, 1896) (i.e. a pattern of social ties in which individuals are embedded and that have important consequences for those individuals (Freeman, 2004; Granovetter, 1973; Scott, 1988)). A central focus of sociological research has been understanding how the social relations between people constitute their reality (Durkheim, 1893; Giddings, 1896; Scott, 1988). Durkheim (1897) defines social cohesion as a characteristic of society that shows the interdependence in between individuals. Granovetter (1973) complements the theory via social network analysis and the examination of tie strength, linking society at both micro and macro levels. Sociologists argue that by uncovering patterns of connections (interactions) and determining the conditions under which these patterns arise, a better understanding of their consequences on society can be gained. Furthermore, Durkheim (1897) argues that individual health behavior can be directly caused by the structure of social integration in a society.

Theoretically, the work of Durkheim (1893, 1897) serves as the foundation for the understanding of the relationship between social networks and health outcomes.

[Durkheim \(1893\)](#) argues that society is a construction of social cohesion, i.e. a characteristic of society that shows the interdependence between individuals of that society, which creates value for individual existence, staving off social disintegration. He further goes on to note that it is societal disintegration that leads to a sense of meaninglessness, disillusionment and depression in societal groups ([Durkheim, 1897](#)) [3]. Social groups are subject to the “collective current” that reflects the collective inclination flowing down the social organization of society, thereby giving rise to the prevalence, or volume, of in-group variation (e.g. variation in the prevalence of depression across groups) ([Durkheim, 1897](#); [Zhang and Centola, 2019](#)).

The fundamental aspect of social cohesion and the staving off the societal prevalence of maladies, such as depression, rests upon maintaining social ties within society, which allow for meaningful interactions. Building on the social ties construct, [Granovetter \(1973\)](#) focuses attention on the strength of interpersonal ties, which at the aggregate group level reflects Durkheim’s social cohesion. [Granovetter \(1973, p. 1377\)](#) notes that “the personal experience of individuals is closely bound up with larger-scale aspects of social structure, well beyond the purview of control of particular individuals.” Furthermore, [Granovetter \(1973\)](#) argues that an intuitive notion of strength of ties should reflect the amount of time, emotional intensity, intimacy and reciprocity between interacting parties. While Granovetter’s work is focused on the importance of both strong and weak ties, he notes that it is strong ties that support social cohesion. As it is social cohesion staves off social disintegration and thus the societal prevalence of maladies (e.g. the prevalence of depression), understanding how tie strength has changed through increased use of social media can speak to the relationship of the use of social media and societal outcomes.

### *2.2 Social cohesion and social media*

Similar to [Zhang and Centola \(2019\)](#), who examine social networks as a structural determinant of health, we employ social cohesion theory and social network analysis to investigate the nexus between (dis)integration (i.e. interactions that occur via social media use) and its macro-implications of prevalence of depression at the population level. Social media are technology-centric ecosystems in which a diverse and complex set of behaviors, interactions and exchanges involving various kinds of interconnected actors (individuals, firms, organizations, and institutions) can occur. [Appel et al. \(2020\)](#) argue that social media can be thought of as environment systems where consumers conduct significant parts of their lives (inclusive of value co-creation; [Sheth, 2020](#)). From this perspective, social media becomes less about the specific technologies or services offered by the platforms, and more about what consumers do in these environments, how they co-create value and their consumption experience.

Individuals around the world use social media in its various forms which are generally categorized as (1) digitally communicating and socializing with known others, such as family and friends, (2) doing the same but with unknown others but who share common interests and (3) accessing and contributing to digital content such as news, gossip, and user-generated product reviews ([Appel et al., 2020](#)). A marketing perspective of social media is that consumers engage on social media platforms to co-create value, i.e. creating, accessing and spreading information to various others, be it known “strong ties” or unknown “weak ties” ([Appel et al., 2020](#)).

Across platforms, historically and the present day, the dominant social media business model has involved monetization of users (audiences) by offering advertising services to anyone wishing to reach those audiences with digital content and marketing communications ([Appel et al., 2020](#)). The primary way social media companies like Meta (formerly Facebook) and Twitter make money is through selling advertising. Using an advertiser-supported model, rather than charging each user, is the easiest way for Meta to garner as many users as possible. The more users on the platform, and the greater their co-creation, the greater the

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number of advertisers and the more those advertisers are willing to spend. The concept of selling advertising while offering a free service is not new; television and newspapers used this model long before social media companies existed (McFarlane, 2021). Meta has 2.89 billion monthly active users worldwide and estimates the average revenue per user (ARPU) was \$32.03 in 2020. Meta's ARPU comes primarily through profits earned from advertisers who use the platform to reach customers.

As noted previously, central to the business model of social media is increasing the number of users of social media (often executed through the suggestion of new user connections, sourcing suggestions from user contact lists, and connections of connections, etc.) (Orlowski, 2020; Van Dijck, 2013). With an increased market size, firms are in a superior position to increase sales. However, by increasing the number of users and the number of user connections, social media platforms increase the number of "weak ties" relative to the number of "strong ties" among users. The purpose of weak tie proliferation is that a larger number of users increases the market size that a social media platform can offer its advertisers (Orlowski, 2020). As Van Dijck (2013, p. 8) notes, "these sites primarily promote interpersonal contact, whether between individuals or groups, they forge personal, professional, or geographical connections and encourage weak ties." As argued under social network analysis, increasing weak ties can diminish social cohesion at the societal level, increasing social disintegration and the prevalence of maladies, such as depression. Thus, we expect that increases in the use of social media within a country will be positively associated with the prevalence of depression in the country (a deleterious relationship) and that this relationship will be observed across country markets.

Coupled with the increase in weak tie connections in society due to the increased use of social media is the underlying business model to increase the time users spend on social media (Orlowski, 2020; Van Dijck, 2013). As noted by Tristan Harris, former Google Design Ethicist, "... Facebook, Snapchat, Twitter, Instagram, YouTube, companies like this, their business model is to keep people engaged on the screen" (Orlowski, 2020). By increasing the time spent by users on a social media platform, the platform is able to increase the monetization of users (e.g. charging more for advertising). The business importance of increasing user time spent on social media as a business model is highlighted by advertiser concerns over the accuracy of social media platform reporting. For instance, in 2019, Facebook settled a class-action lawsuit for \$40 million for overstating the average time its users spent watching video ads. While increasing the time spent on social media by users is advantageous to social media platforms (de Oliveira Santini *et al.*, 2020), the effects on society are less clear.

Some argue that as time spent on social media rises, the threat to underlying social cohesion increases. This can be understood under the displacement hypothesis (cf. Lin, 1993; Twenge *et al.*, 2019), which argues that time spent engaging with social media displaces important activities protective of mental health, such as face-to-face time with friends (Twenge, 2017). For instance, most have experienced being face-to-face with someone who scrolls through their social media feed instead of being engaged with those in the physical realm. Applying the displacement hypothesis, it is argued that time spent on social media replaces strong ties with weak ties, having a deleterious effect on the relationship between the use of social media and mental well-being, due to the loss of social connectivity. This argumentation is consistent with Teo *et al.* (2019) who find that while the increase of face-to-face social contact was associated with lower odds of depression, increased social interaction on social media was not.

Alternatively, it can be argued that tie strength increases as more time is spent on social media. Granovetter (1973) originally conjectured that tie strength is in fact continuous. However, in the literature it has been operationalized as both discrete/categorical (strong vs weak) (e.g. Burke and Kraut, 2016) and continuous (e.g. Gilbert and Karahalios, 2009).

The literature has not yet resolved the issue, but does agree that tie strength is a linear combination of various factors (e.g. communication reciprocity, interaction intensity, emotional closeness, etc. (Gilbert and Karahalios, 2008; Gilbert *et al.*, 2008; Granovetter, 1973)) and is often modeled as a continuum. It can be argued that individuals only increase time spent engaged in an activity if such activity provides direct rewards to the individual, such as increased tie strength. More time spent on social media lends itself to increased opportunities for consumers to interact with others, providing emotional social support (Wellman and Wortley, 1990) which in turn increases the strength of the ties formed. For instance, by spending more time on Instagram a user could gain more knowledge about their connections by viewing their posts or communicating more often with connections, etc., which would increase tie strength. As such, contrary to the arguments of the displacement hypothesis related to social media interaction, one could argue that increases in time spent on social media strengthens ties between social media connections, mitigating the deleterious relationship between the use of social media and the prevalence of depression.

### *2.3 Accounting for cultural, economic and structural factors*

Marketing researchers have long emphasized the perspective that marketing science is built on the generalizability of findings across studies, across cultures, across national boundaries (Burgess and Steenkamp, 2006). Akaka *et al.* (2013) bring forth the concept of “value in context” wherein value co-creation (as occurs within social media) is influenced by contextual factors. A sociological perspective is integrated into the study of international marketing phenomena, highlighting the embeddedness of interactions and exchanges in more complex country-level systems and structures that shape the unique context through which value is created (Edvardsson *et al.*, 2011). Thus, to better isolate the relationship between the use of, and time spent on, social media and the prevalence of depression, we account for the direct effects of cultural, economic and structural factors [4]. This approach, consistent with the tradition of cross-national research, minimizes the spuriousness of our results (e.g. Hultman *et al.*, 2009; Kübler *et al.*, 2018).

*2.3.1 Cultural factors.* National culture is a multidimensional structure that separates nations inclusive of differences in values and norms (De Mooij, 2015; Steenkamp, 2001; Yaprak, 2008). Epidemiological research from public health suggests cross-cultural differences in depression (Kessler and Bromet, 2013). To examine this potential influencing factor, we apply the cultural framework put forth by Schwartz (1994). This framework provides insights into the values of a nation that is non-context restricted (e.g. Hofstede’s (2001) framework is focused on work-oriented values, although scholars have applied it within buying contexts; Hofstede’s framework is used for robustness testing). Scholars argue that Schwartz’s framework is appropriate in the consumer setting (e.g. Guo *et al.*, 2020; Rubera *et al.*, 2011).

Schwartz (1994) defines a two-dimensional bipolar values framework [5]. The first dimension, resultant conservatism (hereinafter referred to as “conservatism”), is anchored by conservatism and openness to change and reflects the preference for traditional lifestyles and constraints as opposed to new and alternative lifestyles and freedom. Cultures higher in conservatism value security, conformity and tradition. Such cultures exhibit restraint of actions and inclinations and are accepting of the status quo, limiting individual freedom of choice (Johnson and Krueger, 2006). Cultures lower on conservatism (higher on openness to change) value the independence of thought, actions and feelings (Schwartz, 2006). The ability to pursue individual actions and emotions within low conservatism cultures allows members to select endeavors that are more fulfilling to them personally, and hence making choices that would increase subjective well-being. Consistent with this argumentation, Sortheix and Schwartz (2017) find such conservation values that emphasize order, self-restriction and resistance to change to be negatively associated with subjective well-being. Thus, we expect a



negative association between conservatism at the country level and prevalence of depression (see Table 2).

The second dimension, resultant self-enhancement (hereinafter referred to as “self-enhancement”) is anchored by self-transcendence and self-enhancement and reflects the tendency to seek constant positive evaluation and a flattering view of the self to feel good. Cultures higher on self-enhancement more strongly embody values of mastery and hierarchy, emphasizing getting ahead through active self-assertion in an attempt to change the world and value social status and prestige. Alternatively, cultures lower on self-enhancement (higher on self-transcendence) more strongly embody the values of egalitarian commitment and harmony, which emphasize the voluntary commitment to promoting the welfare of others, taking actions to build social harmony, and a balance with nature. Given that cultures lower on self-enhancement work to build social harmony, we expect that lower self-enhancement will be negatively associated with the prevalence of depression.

**2.3.2 Economic factors.** In terms of economic factors that could be related to the prevalence of depression, we incorporate income inequality and healthcare expenditures. The literature suggests that higher national levels of income inequality in a country could be linked to lower levels of mental well-being in the country, such as the prevalence of depression (Patel *et al.*, 2018; Wilkinson and Pickett, 2006). For instance, Patel *et al.* (2018) demonstrate a greater risk of depression in populations with higher income inequality. As such, we expect that higher income inequality will be positively associated with the prevalence of depression.

Health care expenditures (by the government) are indicative of the level of economic development of a country. Higher levels of domestic government healthcare expenditures provide a more supportive environment wherein depression could be diagnosed and treated. Thus, we expect a negative association between the level of domestic government healthcare expenditures and the prevalence of depression.

**2.3.3 Structural factors.** Structural factors could influence the prevalence of depression, as such we incorporate demographic structures of gender, age and education. Previous epidemiological studies have shown that there are sizable gender differences in the prevalence rates of many common mental disorders. Gender differences in prevalence revealed women showed higher rates of mood disorders than men (Eaton *et al.*, 2012). Furthermore, the age structure of a population may be related to the overall mental well-being. Results of a population-based study by Stordal *et al.* (2001) indicate an increase in the prevalence of mental disorders, inclusive of depression, with the increasing age of the population. Hence, we expect a positive association in countries where the demographic

Cultural dimension	Description
(1) Conservatism	Values group-relations in society, societal balance, social order, security, conformity and tradition
(2) Intellectual Autonomy	Values individual curiosity, self-direction, creativity and broad-mindedness
(3) Affective Autonomy	Values individual goals over group goals with the importance being placed on the pursuit of self-gratification, pleasure and enjoyment
(4) Egalitarian commitment	Values voluntary commitment to the promotion of societal welfare, equality, social justice, freedom and responsibility
(5) Harmony	Values beauty, peace, harmony with nature and protection of the environment
(6) Mastery	Values efforts to modify one’s environment through self-assertion, ambition and independence
(7) Hierarchy	Values status and hierarchy consciousness, social power, and authority

**Note(s):** Schwartz’s (1994) typology uses seven dimensions to explain cultural variation. These values are further arranged into a two-dimensional structure-oriented by two axes: (1) openness to change versus conservation and (2) self-enhancement versus self-transcendence

**Table 2.**  
Description of the  
seven dimensions  
underlying the bi-polar  
two-dimensional model  
of Schwartz (1994)

structure is higher in females and is older and the prevalence of depression. Lastly, studies indicate that the more educated experience fewer depressive symptoms (Bauldry, 2015). Thus, we expect a negative association between countries with higher educated populations and the prevalence of depression.

### 3. Data

We collected data from a variety of sources. Tables 3 and 4 provide an overview of the variables, their operationalizations, and descriptive statistics. We built an unbalanced panel dataset covering 28 countries. Our independent variables span 2012–2018 and our dependent

Variable	Definition	Coding	Scale	Source
Prevalence of depression	Share of population with depression	Metric	From 0 to 100	Global burden of disease Collaborative network. Global burden of disease study 2019 (GBD, 2019) results. Seattle, United States: Institute for health Metrics and evaluation (IHME), 2019 <a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a>
Use of social media	Share of population with Internet users of any age who use a social network via any device at least once per month	Metric	From 0 to 100	eMarketer; World bank
Time spent on social media	Daily time spent on social media by a social media user within the country	Metric	Number of minutes	Global Web index – Flagship report 2019
Conservatism	A preference for traditional lifestyles and personal constraint as opposed to new and alternative lifestyles and personal freedom	Metric	From –1 to +7 response scale	<i>Schwartz's cultural scores</i>
Self-enhancement	The tendency to seek constant positive evaluation and a flattering view of oneself to feel good	Metric	From –1 to +7 response scale	<i>Schwartz's cultural scores</i>
Gini index	The degree of inequality in the distribution of individual income in a country (high numbers reflect greater inequality)	Metric	From 0 to 100	Euromonitor
Domestic government health expenditure	Domestic general government health expenditure % of general government expenditure	Metric	From 0 to 100	World bank
Population gender	Female population as % of total population	Metric	From 0 to 100	World bank
Population age	Population of ages 15–64% of total population	Metric	From 0 to 100	World bank
Education	Mean years of total schooling across all education levels	Metric	Years of education	Barro and Lee (2013), HDR (2018) and Lee and Lee (2016)

**Table 3.**  
Variable descriptions and operationalizations

Variables	Mean	S.D	1	2	3	4	5	6	7	8
1 Prevalence of depression	3.920	0.920								
2 Use of social media	43.200	15.010	0.271***							
3 Time spent on social media	122.580	51.940	-0.296***	-0.337***						
4 Conservatism	0.160	1.640	-0.5460***	-0.525***	-0.712***					
5 Self-enhancement	0.170	1.780	-0.515***	-0.210**	0.101	0.456***				
6 Gini index	41.140	6.930	-0.136	-0.382***	0.511***	0.518***	0.372***			
7 Domestic government health expenditure	13.350	5.300	0.387***	0.598***	-0.607***	-0.748***	-0.336***	-0.284***		
8 Population age	66.240	4.400	-0.122	0.365***	-0.150*	0.034	0.408***	0.040	-0.041	
9 Population gender	50.310	1.200	0.320***	0.142*	-0.132	-0.360***	-0.408***	-0.159*	0.415***	-0.200**
10 Population education	10.518	2.327	0.339***	0.726***	-0.664***	-0.679***	-0.306***	-0.421***	0.800***	0.088

**Note(s):** \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$

**Table 4.**  
Descriptive statistics

variable spanning 2013–2019. The data includes Argentina, Australia, Brazil, Canada, China, Denmark, Egypt, France, Germany, India, Indonesia, Italy, Japan, Malaysia, Mexico, the Netherlands, New Zealand, Nigeria, the Philippines, Russia, Singapore, South Africa, South Korea, Spain, Sweden, Thailand, the United Kingdom and the United States of America. These countries span five continents and are diverse culturally, economically and structurally.

### 3.1 Dependent variable

**3.1.1 Prevalence of depression.** We acquired data on the prevalence of depression from the Global Burden of Disease Collaborative Network. This set of data provides estimates of prevalence, i.e. share of the population with depression, based on medical, epidemiological data, surveys and meta-regression modeling at the country-level. Our data covers the years 2013–2019.

### 3.2 Independent variables

**3.2.1 Use of social media.** The use of social media was obtained from eMarketer. For each country, estimates of the number of social media users are based on the analysis of survey and traffic data from research firms and regulatory agencies, historical trends and country-specific demographic and socioeconomic factors. The use of social media data was available for 28 countries (2012–2018). The total number of users per country was divided by the country population (sourced from the World Bank) to reflect the use of social media as a share of the population per country.

**3.2.2 Time spent on social media.** Time spent on social media was sourced from the 2019 Flagship Report published by Global Web Index. The report specifies, for each country in our data, the daily time spent on social media in minutes for the years 2012–2018.

**3.2.3 Cultural factors.** Similar to the approach of [Rubera et al. \(2011\)](#), we factor analyzed Schwartz's scores across the countries studied to develop factor scores for conservatism and self-enhancement. Factor scores for conservatism ranged from  $-1.964$  to  $3.77$  (after reverse coding), with higher scores reflecting countries higher in conservatism. Factor scores for self-enhancement ranged from  $-3.305$  to  $4.289$ , where higher scores reflect countries higher in self-enhancement. [Table 5](#) presents the factor loadings.

**3.2.4 Economic factors.** We included income inequality and domestic government health expenditure. Income inequality was operationalized via the Gini index drawn from Euromonitor. Our data covered the years 2012–2018. Health care expenditure, drawn from the World Bank, captured the domestic government general expenditure as a percentage of general government expenditures. Data covered the years 2012–2018.

**3.2.5 Structural factors.** We included population age, gender, and education. Population gender structure, reported as the female population as a percentage of the country's total

Values	Factor 1 Conservatism	Factor 2 Self-Enhancement
Harmony	0.0642	-0.4437
Embeddedness	-0.5493	0.0678
Hierarchy	-0.0527	0.5026
Mastery	0.3956	0.5836
Affective autonomy	0.5700	0.0457
Intellectual autonomy	0.4184	-0.2174
Egalitarianism	0.1868	-0.3948

**Table 5.**  
Schwartz's values-  
factor analysis

population, was drawn from the World Bank and covered the years 2012–2018. Population age structure, reported as the population of ages 15–64 as a percentage of total population, was drawn from the World Bank and covered the years 2012–2108. Population education, reported as average years of schooling, was obtained from multiple sources including Barro and Lee (2013), HDR (2018) and Lee and Lee (2016), covering the years 2012–2018.

## 4. Methodology

### 4.1 Empirical approach and model estimation

To ensure the data fit the assumptions of panel data analysis, we first screened the dependent variable for its unit root. The statistically significant unit root test (depression  $\chi^2 = 237.23$ ,  $p = 0.000$ ) indicated that nonstationary was not an issue for our dependent variable. Next, we tested normality, homoskedasticity, and multicollinearity through following the steps given in the literature (cf. Tang *et al.*, 2014). For normality, we checked the skewness and kurtosis values for depression (skewness =  $-0.040$ , kurtosis =  $2.220$ ), which meets the criteria of normality. For homoskedasticity, we plotted the predicted dependent variables according to the standardized residuals. Residuals are randomly scattered around zero and are relatively evenly distributed, indicating the homoskedasticity of the variance of errors is a valid assumption. We also tested multicollinearity diagnostics. All the individual variable VIF values are below 5.53 (mean VIFs was 3.44), indicating that multicollinearity does not affect our results (see Table 6).

We subsequently explain the source of endogeneity for our data set that comprises data across multiple countries (Papies *et al.*, 2017). Country-level unobserved heterogeneity may predict both the use of social media and the prevalence of depression in our model along with time-varying unobserved factors (e.g. political landscape, technological inducements) that could influence the prevalence of depression. Hence, we used an instrumental variable approach to assess the use of social media with the common instrumental variable method which utilizes the lagged value of the variables (Jacobson, 1990). To this end, we employed the Durbin-Wu-Hausman test (Davidson and MacKinnon, 1993) to test the endogeneity of the use of social media. Results indicate that we are not able to reject the null hypotheses for the Durbin-Wu-Harman test, indicating that endogeneity is not an issue in our models ( $\chi^2 = 0.021$ ,  $p = 0.882$ ).

To determine the appropriateness of the empirical model, we first conducted a Breusch-Pagan Lagrange Multiplier test. The results indicate that the data contain unobserved individual country effects ( $\chi^2 = 548.49$ ,  $p = 0.000$ ), suggesting that a panel model, instead of the pooled OLS models, should be selected. Furthermore, we employed the Hausman test to determine whether we should model the unobserved effects as fixed or random effects. The Hausman test yielded statistically non-significant results, indicating that the random effects

Variable	VIF	1/VIF
Use of social media	4.53	0.22
Time spent on social media	4.70	0.21
Conservatism	4.25	0.23
Self-enhancement	1.97	0.51
Gini index	2.03	0.49
Domestic government health expenditure	4.48	0.22
Population age	2.03	0.49
Population gender	1.47	0.68
Population education	5.53	0.18
Mean VIF	3.44	

**Table 6.**  
Multicollinearity  
diagnostics

model should be preferred ( $\chi^2 = 1.87, p = 0.967$ ). The specifications of the random effect models are as follows:

$$\begin{aligned}
 \text{Prevalence of Depression}_{i(t+1)} = & \alpha + \beta_1 * \text{Use of Social Media}_{it} \\
 & + \beta_2 * \text{Time Spent on Social Media}_{it} \\
 & + \beta_3 * \text{Conservatism}_i + \beta_4 * \text{Self - Enhancement}_i \\
 & + \beta_5 * \text{Gini Index}_{it} \\
 & + \beta_6 * \text{Domestic Government Health Expenditure}_{it} \\
 & + \beta_7 * \text{Population Age}_{it} + \beta_8 * \text{Population Gender}_{it} \\
 & + \beta_9 * \text{Population Education}_{it} + \sum_t \text{Year}_t \\
 & + \sum_i \text{Country}_i + \varepsilon_{it}
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 \text{Prevalence of Depression}_{i(t+1)} = & \alpha + \beta_1 * \text{Use of Social Media}_{it} \\
 & + \beta_2 * \text{Time Spent on Social Media}_{it} \\
 & + \beta_3 * \text{Use of Social Media} * \text{Time Spent on Social Media}_{it} \\
 & + \beta_4 * \text{Conservatism}_i + \beta_5 * \text{Self - Enhancement}_i \\
 & + \beta_6 * \text{Gini Index}_{it} \\
 & + \beta_7 * \text{Domestic Government Health Expenditure}_{it} \\
 & + \beta_8 * \text{Population Age}_{it} + \beta_9 * \text{Population Gender}_{it} \\
 & + \beta_{10} * \text{Population Education}_{it} + \sum_t \text{Year}_t + \sum_i \text{Country}_i \\
 & + \varepsilon_{it}
 \end{aligned} \tag{2}$$

in which  $\text{Prevalence of Depression}_{i,t+1}$  refers to country ( $i$ ) in the year ( $t + 1$ ). The  $\text{Use of Social Media}_{it}$  is the percentage of users in the country ( $i$ ) in year ( $t$ ), and  $\text{Time Spent on Social Media}_{it}$  is the average user time spent on social media users in the country ( $i$ ) in year ( $t$ ).  $\text{Conservatism}_i$  and  $\text{Self - Enhancement}_i$  are Schwartz's cultural values factor scores of country ( $i$ ). We also include Gini Index, Domestic Government Health Expenditure, Population Gender, Population Age, and Population Education for each country ( $i$ ) in year ( $t$ ).  $\text{Year}_t$  represents a set of year dummies,  $\text{Country}_i$  refers to a set of country dummies, and  $\varepsilon_{it}$  is the error term.

## 5. Results

### 5.1 Use of social media

We first analyze the relationship between the use of social media and the prevalence of depression (see Table 7). As shown in Model 1, the use of social media was positively associated with the prevalence of depression ( $\beta = 0.00923, p < 0.001$ ). Model 2 accounts for the

	Model 1 Prevalence of depression	Model 2 Prevalence of depression	Model 3 Prevalence of depression	Model 4 Prevalence of depression
Use of social media	0.00923*** (7.15)	0.00696*** (4.08)	0.00719*** (4.17)	0.0120*** (5.02)
Time spent on social media			-0.000357 (-0.93)	0.00113+ (1.75)
Use of social media*Time spent on social media				-0.00004** (-2.86) -0.0000356** (-2.83)
<i>Cultural factors</i>				
Conservatism		-1.384*** (19.19)	-1.359*** (17.67)	-1.322*** (17.32)
Self-enhancement		1.020*** (13.70)	1.008*** (13.36)	1.044*** (13.94)
<i>Economic factors</i>				
Gini index		0.00438 (0.70)	0.00361 (0.57)	-0.00364 (-0.54)
Domestic government health expenditure		-0.00808 (-1.38)	-0.00800 (-1.37)	-0.00813 (-1.42)
<i>Structural factors</i>				
Population age		0.0290*** (3.67)	0.0295*** (3.73)	0.0307*** (3.97)
Population gender		0.0737 (0.79)	0.0823 (0.87)	0.100 (1.08)
Population education		0.00861 (0.28)	0.0102 (0.34)	0.00203 (0.07)
Constant	2.32500*** (42.10)	-3.674393 (-1.00)	-3.525 (-0.74)	-4.300 (-0.92)
Year	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
N	192	192	192	192
Overall	30.5%	37.2%	37.6%	40.7%
R-square				

**Note(s):** *t*-values in parentheses: +*p* < 0.10, \**p* < 0.05, \*\**p* < 0.01, \*\*\**p* < 0.001

**Table 7.**  
Model results

effects of cultural, economic, and structural factors. The use of social media retains its positive relationship with the prevalence of depression ( $\beta = 0.00696$ ,  $p < 0.01$ ). Cultural factors, namely conservatism ( $\beta = -1.38400$ ,  $p < 0.001$ ) and self-enhancement ( $\beta = 1.02000$ ,  $p < 0.001$ ), are both associated with the prevalence of depression. We did not observe significant associations in relation to the economic factors. In relation to the structural factors, only population age ( $\beta = 0.02920$ ,  $p < 0.001$ ) was observed to be associated with the prevalence of depression. We also determine the effect size of the use of social media on the average population for the prevalence of depression in terms of the number of people to determine the human cost. The results indicate that a one percent increase in the use of social media in a country is associated with an increase in depression in the population by about 12,712 people on average, varying by country population.

The results presented in Model 3 examine the relationship between time spent on social media and the prevalence of depression. Our results reveal that the use of social media retains its significant positive association with the prevalence of depression ( $\beta = 0.00719$ ,  $p < 0.001$ ).

Time spent on social media was not associated with the prevalence of depression ( $\beta = -0.00036, p = 0.354$ ). Model 4 tested whether time spent on social media moderated the relationship between the use of social media and the prevalence of depression. The results indicate that time spent on social media negatively moderates the relationship between the use of social media and the prevalence of depression ( $\beta = -0.0000356, p < 0.01$ ). Conservatism and self-enhancement retained significant associations with the prevalence of depression, as did population age.

### 5.2 Robustness tests

We performed a series of robustness tests to enhance confidence in our results (the dependent variable in all robustness tests is the prevalence of depression). First, we collected information regarding the social media platforms Facebook and YouTube from eMarketer. These were the only two social media platforms within the eMarketer data covering sufficient years to serve as a valid robustness test. As time spent on social media at the platform level (i.e. Facebook, YouTube) is not available across time and countries, we used the country-level time spent on social media data sourced from Global Web Index which accounted for the use of social media. The results (see Table 8) indicate that the use of Facebook has a positive association with the prevalence of depression (Model 3:  $\beta = 0.00355, p < 0.05$ ) when we account for time spent on social media, cultural, economic, and structural factors. The results suggest that in the US a one percent increase in the use of Facebook would increase depression by about 11,360 people. We tested the moderating effect of time spent on social media on the relationship between the use of Facebook and the prevalence of depression. The results indicate that time spent on social media negatively moderates the relationship between the use of Facebook and the prevalence of depression (Model 4:  $\beta = -0.00005, p < 0.001$ ). Similarly, in relation to YouTube, the results indicate a positive association between use and the prevalence of depression (Model 6:  $\beta = 0.02180, p = 0.001$ ) when we account for time spent on social media, cultural, economic, and structural factors. The results suggest that in the US, a one percent increase in the use of YouTube is associated with an increase in depression by about 69,760 people. Our results also indicate that time spent on social media negatively moderates the relationship between the use of YouTube and the prevalence of depression (Model 8:  $\beta = -0.00007, p < 0.001$ ).

Second, we collected information regarding the prevalence of depression by gender from the Global Burden of Diseases Collaborative Network. The results, reported in Table 9, remained consistent. The use of social media was positively associated with the prevalence of depression within both female (Model 3:  $\beta = 0.00784, p < 0.001$ ) and male (Model 7:  $\beta = 0.00658, p < 0.001$ ) populations when we account for time spent on social media, cultural, economic, and structural factors. Similarly, results indicated that time spent on social media negatively moderated the relationship between the use of social media and the prevalence of depression for females (Model 4:  $\beta = -0.00004, p < 0.05$ ) and male populations (Model 8:  $\beta = -0.00003, p < 0.001$ ).

Third, as marketing scholars have often employed the cultural framework of Hofstede, as opposed to Schwartz, we tested our models using Hofstede as a robustness test to understand if cultural values under differing frameworks were significant. Consistent with our initial models, our results (see Table 10) indicate that the use of social media had a positive association with the prevalence of depression (Model 3:  $\beta = 0.00719, p < 0.001$ ). Furthermore, our analyses show that time spent on social media significantly moderates the relationship between the use of social media and the prevalence of depression when Hofstede's cultural factors are accounted for in addition to the economic and structural factors (Model 4:  $\beta = -0.00004, p < 0.01$ ). All dimensions of culture are also significantly related to the prevalence of depression.



	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Use of Facebook	0.00733*** (6.22)	0.006356* (1.98)	0.00355* (1.98)	0.01440*** (4.38)	0.02010*** (5.74)	0.02180*** (5.65)	0.02170*** (5.55)	0.03160*** (7.29)
Use of YouTube			-0.000181 (-0.45)	0.00179** (2.80)			-0.00017 (-0.32)	0.00330*** (3.41)
Time spent on social media				-0.00005*** (-3.87)				
Facebook*Time spent on social media								
Use of YouTube*Time spent on social media								-0.00007*** (-4.18)
<i>Cultural factors</i>								
Conservatism	-1.41400*** (18.81)	0.00179 (0.27)	0.00123 (0.18)	-0.00213 (-0.32)	-1.24100*** (14.64)	0.01460+ (1.95)	-1.22800*** (13.04)	-1.22700*** (14.02)
Self-enhancement	1.08500*** (14.60)	-0.00666 (-1.08)	1.082*** (14.41)	1.07100*** (14.93)	0.77600*** (8.05)	0.00103 (0.14)	0.77100*** (7.86)	0.86600*** (9.22)
<i>Economic factors</i>								
Gini index								0.00637 (0.86)
Domestic government health expenditure			-0.00658 (-1.06)	-0.00722 (-1.22)			0.00120 (0.17)	-0.00511 (-0.75)
<i>Structural factors</i>								
Population age		0.03100*** (3.35)	0.0315*** (3.37)	0.03080*** (3.45)		0.04100*** (4.70)	0.04200*** (4.64)	0.03790*** (4.48)
Population gender		0.14800 (1.55)	0.155 (1.59)	0.12100 (1.30)		0.05870 (0.60)	0.06180 (0.63)	0.04280 (0.47)
Population education		-0.00161 (-0.05)	-0.000962 (-0.03)	-0.00861 (-0.28)		0.04050 (1.20)	0.04170 (1.23)	0.00877 (0.27)
Constant	2.34900*** (35.89)	-6.67100 (-1.36)	-7.02500 (-1.41)	-5.42600 (-1.14)	1.73400*** (9.97)	-1.77800*** (-0.40)	-4.69100 (-0.94)	-3.13800 (-0.67)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	185	185	185	185	137	137	137	137
Overall R-square	25.7%	32.2%	32.3%	38.7%	24.3%	40.2%	40.2%	49.0%

Note(s): t-values in parentheses: +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.001$ , \*\*\*  $p < 0.0001$

**Table 8.** Social media platforms (Facebook and YouTube) robustness tests

**Table 9.**  
Depression by gender  
robustness tests

	Model 1 (Female)	Model 2 (Female)	Model 3 (Female)	Model 4 (Female)	Model 5 (Male)	Model 6 (Male)	Model 7 (Male)	Model 8 (Male)
Use of social media	0.01040*** (5.90)	0.00768** (3.25)	0.00784** (3.27)	0.013400*** (4.00)	0.00773*** (8.06)	0.00626*** (5.09)	0.00653*** (5.34)	0.0106*** (6.30)
Time spent on social media			-0.00024 (-0.44)	0.00148 (1.64)			-0.00049+ (-1.78)	0.00077+ (1.69)
Use of social media*Time spent on social media				-0.00004* (-2.34)				-0.00003*** (-3.40)
<i>Cultural factors</i>								
Conservatism			-1.32100*** (12.36)	-1.27800*** (11.96)		-1.42900*** (27.47)	-1.39500*** (25.33)	-1.36300*** (25.23)
Self-enhancement			1.32700*** (12.66)	1.36800*** (13.06)		0.67800*** (12.63)	0.66300*** (12.27)	0.69300*** (13.08)
<i>Economic factors</i>								
Gini index		0.00559 (0.64)	0.00507 (0.58)	-0.00331 (-0.35)		0.00295 (0.65)	0.00188 (0.41)	-0.00429 (-0.90)
Domestic government health expenditure		-0.00698 (-1.23)	-0.00982 (-1.22)	-0.01010 (-1.26)		-0.00629 (-1.49)	-0.00617 (-1.47)	-0.00628 (-1.55)
<i>Structural factors</i>								
Population age		0.03170** (2.90)	0.03210** (2.92)	0.03350** (3.09)		0.02590*** (4.55)	0.02660*** (4.70)	0.02760*** (5.04)
Population gender		0.11500 (0.88)	0.12100 (0.92)	0.14100 (1.09)		-0.01810 (-0.27)	-0.00618 (-0.09)	0.00884 (0.14)
Population education		-0.01420 (-0.34)	-0.01310 (-0.31)	-0.02260 (-0.54)		0.03120 (1.42)	0.03350 (1.53)	0.02650 (1.25)
Constant		-4.46400 (-0.68)	-4.74000 (-0.71)	-5.63700 (-0.86)		0.80700 (0.23)	0.23500 (0.07)	-0.42400 (-0.13)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	192	192	192	192	192	192	192	192
Overall R-square	22.0%	26.9%	27.0%	29.5%	39.7%	4	49.8%	53.3%

**Note(s):** *t*-values in parentheses: +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.001$ , \*\*\*  $p < 0.000$

	Model 1	Model 2	Model 3	Model 4
Use of social media	0.00923*** (7.70)	0.00696*** (4.08)	0.00719*** (4.17)	0.01200*** (5.02)
Time spent on social media			-0.00036 (-0.93)	0.00113+ (1.75)
Use of social media*Time spent on social media				-0.00004** (-2.83)
<i>Cultural factors</i>				
Power distance		0.00167 (0.04)	-0.00183 (-0.04)	-0.00549 (-0.13)
Individualism		0.06630*** (15.43)	0.06530*** (14.79)	0.06700*** (15.37)
Masculinity		-0.03340*** (-11.12)	-0.03340*** (-11.12)	-0.03510*** (-11.71)
Uncertainty avoidance		0.00579* (2.14)	0.00552* (2.03)	0.00418 (1.54)
Long-term orientation		0.02540** (2.76)	0.02410* (2.57)	0.01910* (2.05)
Indulgence		-0.09070** (-2.73)	-0.09310** (-2.80)	-0.0994** (-3.05)
<i>Economic factors</i>				
Gini index		0.00438 (0.70)	0.00361 (0.57)	-0.00364 (-0.54)
Domestic government health expenditure		-0.00808 (-1.38)	-0.00800 (-1.37)	-0.00813 (-1.42)
<i>Structural factors</i>				
Population age		0.02900*** (3.67)	0.02950*** (3.73)	0.03070*** (3.97)
Population gender		0.07370 (0.79)	0.08230 (0.87)	0.10000 (1.08)
Population education		0.00861 (0.28)	0.01020 (0.34)	0.00203 (0.07)
Constant	2.32500*** (45.16)			
Year dummies	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes
N	192	192	192	192
Overall R-square	34.3%	37.2%	37.6%	40.7%

**Note (s):** *t*-values in parentheses:  $-p < 0.10$ ,  $*p < 0.05$ ,  $**p < 0.001$ ,  $***p < 0.000$

**Table 10.**  
Hofstede's cultural  
values robustness tests

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Fourth, we assessed the robustness of our findings first using the same year for both the use of social media and the prevalence of depression, then the dependent variable lagged by two years. In robustness tests, the results remained consistent with our main results (see [Table 11](#)).

Finally, serial correlation in errors might be an issue in our models. We estimated our models using the Stata `xtregar` procedure that controls for the first-order autoregressive disturbance. The levels of significance were substantially similar, and all signs of the coefficients were the same ([Table 12](#)).

## 6. Discussion

This study is framed by two research questions. First, does the use of social media have a positive or negative association with the prevalence of depression? Second, does increased time spent on social media increase or decrease the association between the use of social media and the prevalence of depression? We find that even when accounting for cultural, economic, and structural factors, that the use of social media is positively associated with the prevalence of depression at the population level, and that this relationship is mitigated by increased time spent on social media. The implications of the results are discussed, as well as the limitations and directions for future research.

### 6.1 Implications for academics

International marketing scholars have been calling for an increased understanding of the effects of marketing on society (e.g. [Carrigan et al., 2005](#); [Eteokleous et al., 2016](#)). While social media has enhanced connectivity and serves as a vehicle for global business transformation, social media platforms are being increasingly scrutinized for potential deleterious externalities of their business models.

Social media are complex ecosystems wherein not only consumption occurs, but consumers engage to co-create. This work, building on the theoretical foundation of social network analysis (e.g. [Durkheim, 1893, 1897](#); [Granovetter, 1973](#); [Zhang and Centola, 2019](#)), demonstrates a potential negative externality. Theoretically, these findings give credence to the sociological arguments of social network analysis. Specifically, [Durkheim \(1893\)](#) argues that society is a construction of social cohesion that creates value for individual existence, staving off social disintegration and societal maladies, and [Granovetter \(1973\)](#) argues that although weak ties provide new opportunities, it is strong ties, characterized by time spent interacting, emotional intensity, intimacy, and reciprocity which provide for social cohesion. Our findings, building the arguments of [Van Dijck \(2013\)](#) who contends that social media platforms primarily promote interpersonal contact with weak ties, suggest that increased use of social media within a country increases the prevalence of weak ties among societal members lessening social cohesion, increasing social disintegration, consequently increasing the prevalence of depression. This is supportive of the societal approach undertaken, as the work of Durkheim, Granovetter and others, speak to the fundamental social organization underlying society.

Drawing from a dynamic systems approach in studying exchanges and interactions among various stakeholders, the role of the environmental context (i.e. country factors) in value creation is emphasized ([Akaka et al., 2013](#)). Following the tradition of cross-national research, we further expand the concept of “value in context” by examining the relationship of the use of social media (and engagement on value co-creation on social media) while accounting for cultural, economic, and structural factors. This study further contributes to the literature on social cohesion and social networks by providing a more holistic examination into the environmental context in which macro-level patterns and micro-level

	Model 1 Same year	Model 2 Same year	Model 3 Same year	Model 4 Same year	Model 5 $t + 2$	Model 6 $t + 2$	Model 7 $t + 2$	Model 8 $t + 2$
Use of social media	0.00420*** (6.22)	0.01050*** (5.49)	0.01090*** (5.64)	0.01570*** (5.88)	0.00714*** (5.18)	0.00448* (2.42)	0.00446* (2.38)	0.00821** (3.21)
Time spent on social media			-0.00056 (-1.30)	0.00096 (1.32)			0.00004 (0.09)	0.00120+ (1.78)
Use of social media*Time spent on social media				-0.00004* (-2.57)				-0.00003* (-2.12)
<i>Cultural factors</i>								
Conservatism	-1.38200*** (17.09)	-1.34300*** (15.62)	-1.30500*** (15.23)	-1.30500*** (15.23)		-1.38100*** (16.58)	-1.38500*** (15.13)	-1.36100*** (14.95)
Self-enhancement	0.97100*** (11.63)	0.95300*** (11.29)	0.98900*** (11.77)	0.98900*** (11.77)		1.03000*** (12.44)	1.03100*** (12.12)	1.06800*** (12.47)
<i>Economic factors</i>								
Gini index	0.00954 (1.36)	0.00832 (1.18)	0.00092 (0.12)	0.00092 (0.12)		0.00273 (0.39)	0.00286 (0.40)	-0.00294 (-0.39)
Domestic government health expenditure	-0.00877 (-1.34)	-0.00864 (-1.32)	-0.00878 (-1.37)	-0.00878 (-1.37)		-0.00466 (-0.76)	-0.00466 (-0.76)	-0.00587 (-0.96)
<i>Structural factors</i>								
Population age	0.03250*** (3.68)	0.03340*** (3.78)	0.03460*** (3.98)	0.03460*** (3.98)		0.02560** (2.83)	0.02550** (2.78)	0.02640** (2.92)
Population gender	-0.003470 (-0.33)	-0.02110 (-0.20)	-0.00308 (-0.03)	-0.00308 (-0.03)		0.15000 (1.44)	0.15000 (1.43)	0.16000 (1.54)
Population education	0.00151 (0.04)	0.00406 (0.12)	-0.00433 (-0.13)	-0.00433 (-0.13)		0.02000 (0.61)	0.01960 (0.58)	0.00824 (0.25)
Constant	3.34000*** (17.51)	1.92220 (0.36)	1.27000 (0.24)	0.47800 (0.09)	2.46350*** (75.25)	-6.81600 (-1.29)	-6.8010 (-1.28)	-7.10900 (-1.36)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	192	192	192	192	164	164	164	164
Overall	32.86%	39.0%	39.6%	42.2%	23.57%	30.5%	30.5%	32.9%
R-square								

Note(s):  $t$ -values in parentheses: +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table 11.  
Same year and  $t + 2$   
robustness tests

	Model 1	Model 2	Model 3	Model 4
Use of social media	0.00641*** (4.71)	0.00363* (2.39)	0.00374* (2.42)	0.00656** (2.98)
Time spent on social media			-0.00012 (-0.41)	0.00071 (1.27)
Use of social media*Time spent on social media				-0.00002+ (-1.77)
<i>Cultural factors</i>				
Conservatism		-1.39000*** (20.81)	-1.38300*** (19.94)	-1.36400*** (19.66)
Self-enhancement		1.09000*** (17.07)	1.08700*** (16.82)	1.09400*** (17.04)
<i>Economic factors</i>				
Gini index		-0.00027 (-0.05)	-0.00043 (-0.08)	-0.00309 (-0.56)
Domestic government health expenditure		-0.00287 (-0.63)	-0.00310 (-0.67)	-0.00323 (-0.70)
<i>Structural factors</i>				
Population age		0.03280*** (3.86)	0.03300*** (3.87)	0.03440*** (4.05)
Population gender		0.14900 (1.47)	0.15200 (1.49)	0.16300 (1.62)
Population education		-0.00858 (-0.43)	-0.00835 (-0.41)	-0.00971 (-0.48)
Constant	2.434*** (36.17)	-6.80800 (-1.31)	-6.92300 (-1.33)	-7.58900 (-1.47)
Year	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
N	192	192	192	192
Overall R-square	29.3%	35.1%	35.4%	38.2%
<b>Note(s):</b> <i>t</i> -values in parentheses: + $p < 0.10$ , * $p < 0.05$ , ** $p < 0.01$ , *** $p < 0.001$				

**Table 12.**  
Auto regressive  
predictions  
robustness tests

interactions are embedded. Here, we note, for international marketing researchers, the importance of accounting for country factors in delineating associations with the use of social media as we expand beyond our traditional dependent variables, in the search for an understanding of its externalities.

Our findings are consistent with the arguments of social network analysis. Specifically, [Granovetter \(1973\)](#) argues that increased interaction time can increase tie strength. Through increased tie strength, social cohesion increases. Our findings suggest that as time spent on social media increases, the deleterious relationship between the use of social media and the prevalence of depression diminishes. This is theoretically interesting as it provides a positive perspective on increased time spent on social media. One could argue that increased time spent on social media is founded on the increase in intrinsic rewards gained through interactions on social media platforms, or simply social cohesion, thereby enhancing meaning in the lives of those interacting.

We believe that it is also important to note that this work, which is theorized and tested at the societal level, is generally consistent with the results of a number of studies across a wide range of disciplines, conducted at the individual-level, i.e. use of social media increases depression. This is important as it is common to assume the presence of the ecological fallacy

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when dealing with country-level data. However, [Idrovo \(2011\)](#) proposes three guidelines that must be met to confirm the existence of the ecological fallacy. Paraphrasing [Idrovo \(2011\)](#), these guidelines are (1) results must be obtained with ecological (population) data, (2) data must be inferred to individuals and (3) results obtained at the population level are contradictory to those obtained at the individual-level. Our work, when examined against these guidelines, suggests that the ecological fallacy is not present. Understanding the complexities of the ecological fallacy, and approaches to avoid falling victim to it, is important for international marketing scholars when engaging in ecological studies.

### *6.2 Implications for practice*

The findings suggest implications for practice to three specific publics, i.e. social media platforms (i.e. multinational companies), firms/users engaged in marketing and value co-creation via social media platforms, and public policymakers. First, given the generalizability of our results, we suggest that multinational social media companies could hold themselves responsible for the social harm they may cause. Social media platforms should act proactively to address negative externalities when identified. Given the consistent cross-national effects of the use of social media on the prevalence of depression (which are consistent with some of the individual-level effects previously identified), social media companies should work to provide, in the best interest of their users (and their customers) and society in which they operate, a service that is not associated with increases in the prevalence of depression. We recommend that the underlying business model of social media needs to be reconsidered to ensure that all stakeholders are respected. Users must be viewed as part of the digital ecosystem wherein social media companies work to not harm their users ([Carrigan et al., 2005](#)).

One recommendation to overcome this would be for social media companies to revise their business model to focus on the formation of strong ties among users. Three approaches could be potential options. First, social media companies could monitor for interactions between users, periodically suggesting removing connections that fail to form strong ties (e.g. contacts/followers who have not interacted over a six-month or one-year period). While this may limit the overall number of connections within a social network platform, it could provide for a stronger set of connections, which would allow for more effective marketing (therefore still allowing for a business model with significant revenue generation). Second, to enhance interactivity, social media companies could rate each user as to their level of interactions with their followers, which would provide users important information as to the nature of those they follow. A rating system would motivate social media users to interact with followers, thereby increasing tie strength and social cohesion. Third, social media companies should continue to work to increase user time spent on their platforms. This recommendation, supported by the results, is contrary to generally accepted guidelines. For example, Facebook, in response to pressure from critics and politicians who raised concerns over time spent online, created “time limit” tools ([Appel et al., 2020](#)). The findings of this study suggest that increased time spent on social media platforms has a positive association in society, and as such, if done in a socially responsible manner, could be beneficial. Perhaps, companies can provide users with more control over their activity streams (e.g. Newsfeed on Facebook), a system that allows users to tune activity stream parameters to prioritize tie strength in curating more meaningful activity streams for interaction ([Gilbert and Karahalios, 2009](#)).

For those marketing via social media, it is important that they begin to leverage their power as a response to the potentially deleterious effect of social media on society. Those advertising through social media platforms can demand positive change in the business practices of social media platforms. Increased pressure from advertisers will motivate change. Academics and practitioners alike are recognizing that the responsibilities for mental

wellness effects of the use of social media do not solely fall upon the individual user, but on firms, regulators and policymakers (Eteokleous *et al.*, 2016; Lukoff, 2019). Many firms and stakeholders in the digital realm are being called on to take action to reduce harm and enhance the digital well-being of consumers. Firms cannot build brands and effectively engage and co-create with customers in a digital ecosystem that harms those very same users. By using their market power, firms can demand socially responsible practices to be engaged by social media platforms.

This work also suggests important avenues for public policy makers. Given the transnationality of social media players, this would require a significant amount of global governmental coordination (which often proves difficult). Governments are increasingly holding firms responsible for the harm they bring to society. As noted earlier, the social cost of the prevalence of depression is quite significant (Coretti *et al.*, 2019; WHO, 2017). Whether it be lost productivity (Tsitsika *et al.*, 2014), pharmaceuticals used to treat depression (Jönsson and Bebbington, 1994), hospitalization due to depression and the loss of life due to suicide (an all too often unfortunate outcome of depression) (McCrae *et al.*, 2017). Much as governments are holding pharmaceutical companies (e.g. Purdue Pharma) and retailers (e.g. Walmart) accountable for the costs associated with the marketing harmful medications (e.g. OxyContin), so too could social media companies be held accountable for the burdens brought on by the use of such platforms. Some research already suggests that social media usage increases depression at the individual-level (e.g. Appel *et al.*, 2016; Karim *et al.*, 2020; Keles *et al.*, 2020; Nesi and Prinstein, 2015; Seabrook *et al.*, 2016; Twenge, 2020; Vidal *et al.*, 2020). Our work demonstrates the positive association between the use of social media and the prevalence of depression at the country level is generalizable across countries. If social media usage is known to cause harm, and social media companies place profits before their responsibilities to society, would it not be reasonable for social media companies to be held financially accountable?

### *6.3 Limitations and additional research directions*

While this work provides important new insights on the externalities of the use of social media, it is not without its limitations. First, given the publicly available data (social media companies do not report the number of users per country), we only examined the use of social media usage and time spent on social media at a holistic level (across all social media platforms). As such, it is difficult to discern between time spent on social media being exposed to marketing activities of different firms (e.g. advertising (Stafford and Pounders, 2021), firm-generated content (Kumar *et al.*, 2016)) versus connecting and interacting with friends to deepen meaningful connections. A more detailed data set, where both use of, and time spent on, individual platforms are collected would enhance our understanding of this topic. For example, one might argue that connections on Facebook reflect stronger ties than Twitter and therefore have differential relationships with the prevalence of depression. Similarly, a deeper examination of the various types of content exposed to and activities engaged in via increased time spent on social media would help provide a better understanding of the more varied effects of social media use.

Second, while the prevalence of depression is an important externality to investigate, there are many other externalities that could be examined. For instance, is the use of social media positively or negatively associated with the prevalence of anxiety, happiness, suicide or social unrest? Social media also increases connections between individuals without geographic limitations. If one were able to capture the diversity of user connections, one may be able to examine whether the use of social media is positively (or negatively) related to nationalism, ethnocentrism, or racism, and whether such associations are similar across countries.

Third, more detailed, nuanced theoretical findings could be derived from an examination of the content offered through each platform. It is unclear how easily this could be addressed.



For instance, in 2020, estimates from Facebook indicate that there are over 317,000 posts every 60 s. The capturing of data, even at a sampling level, brings forth a set of challenges related to analyzing such data. Even if there were the opportunity to capture and analyze a census of social media content, a critical question will be whether the content was viewed by the average user. Similarly, research has distinguished between passive (e.g. consuming information without direct exchanges) and active social media use (e.g. activities that facilitate direct exchanges with each other) (cf., [Fardouly et al., 2020](#); [Verduyn et al., 2015](#)). Extant work suggests that the use of social media depended entirely on the nature of their use where passive activity was more strongly associated with depression while active use was not. Further research could benefit from the examination of the nature of both content and interactions on social media platforms.

Fourth, the negative externality of the use of social media identified in this work suggests a need for research concerning how the management of said companies views their social responsibilities from a stakeholder perspective. Both social responsibility and stakeholder perspectives have been important areas of research in the field of international marketing.

### Notes

1. To avoid the ecological fallacy, where individual-level effects are generalized to the country-level, we built our study on social cohesion at the society level, and then compare our country-level results to research conducted at the individual-level (see [Table 1](#) for a summary of individual-level research in this area) in the discussion section.
2. To assess the effects of the independent variables on the prevalence of depression (our dependent variable), we employ a lagged model. As such, the independent variables in our model cover the time period 2012–2018, whereas our dependent variable covers the time period 2013–2019. In robustness testing we also examine same year effects as well as an additional lagged period.
3. Although some have questioned whether Durkheim’s work on depression and suicide falls victim to the ecological fallacy (e.g. [Selvin, 1958](#)) or to Simpson’s paradox, other scholars argue that his arguments are built on the “collective current” that reflects social organization (cf. [Berk, 2006](#)). In this work we employ the social organization approach of social network analysis, which is characteristic of the micro-macro bridge that is also used by [Granovetter \(1973\)](#). Furthermore, we demonstrate that our findings at the country-level are consistent with work across a wide range of disciplines at the individual-level (although much of this work has mixed findings, when significance is found it demonstrates a deleterious effect of social media on depression), therefore providing evidence against this work’s reflection of the Simpson paradox, or hindrance due to the ecological fallacy.
4. With the country-level parallels, we have worked to closely mirror the individual-level covariates commonly included within the literature that examines the association between social media use and depression at the individual level (e.g. [Lin et al., 2016](#)).
5. [Schwartz’s \(1994\)](#) typology uses seven dimensions to explain cultural variation (presented in [Table 2](#)). These seven dimensions are further arranged into a two-dimensional bipolar values framework.

### References

- Akaka, M.A., Vargo, S.L. and Lusch, R.F. (2013), “The complexity of context: a service ecosystems approach for international marketing”, *Journal of International Marketing*, Vol. 21 No. 4, pp. 1-20.
- Allcott, H., Braghieri, L., Eichmeyer, S. and Gentzkow, M. (2020), “The welfare effects of social media”, *American Economic Review*, Vol. 110 No. 3, pp. 629-676.
- Appel, H., Gerlach, A.L. and Crusius, J. (2016), “The interplay between Facebook use, social comparison, envy, and depression”, *Current Opinion in Psychology*, Vol. 9, pp. 44-49.

- 
- Appel, G., Grewal, L., Hadi, R. and Stephen, A.T. (2020), "The future of social media in marketing", *Journal of the Academy of Marketing Science*, Vol. 48 No. 1, pp. 79-95.
- Baker, D.A. and Algorta, G.P. (2016), "The relationship between online social networking and depression: a systematic review of quantitative studies", *Cyberpsychology, Behavior, and Social Networking*, Vol. 19 No. 11, pp. 638-648.
- Banjanin, N., Banjanin, N., Dimitrijevic, I. and Pantic, I. (2015), "Relationship between internet use and depression: focus on physiological mood oscillations, social networking and online addictive behavior", *Computers in Human Behavior*, Vol. 43, pp. 308-312.
- Barro, R. and Lee, J.W. (2013), "A new data set of educational attainment in the world, 1950-2010", *Journal of Development Economics*, Vol. 104, pp. 184-198.
- Bauldry, S. (2015), "Variation in the protective effect of higher education against depression", *Society of Mental Health*, Vol. 5 No. 2, pp. 145-161.
- Berk, B.B. (2006), "Macro-micro relationships in Durkheim's analysis of egoistic suicide", *Sociological Theory*, Vol. 24 No. 1, pp. 58-80.
- Blomfield Neira, C.J. and Barber, B.L. (2014), "Social networking site use: linked to adolescents' social self-concept, self-esteem, and depressed mood", *Australian Journal of Psychology*, Vol. 66 No. 1, pp. 56-64.
- Brunborg, G.S. and Andreas, J.B. (2019), "Increase in time spent on social media is associated with modest increase in depression, conduct problems, and episodic heavy drinking", *Journal of Adolescence*, Vol. 74, pp. 201-209.
- Burgess, S.M. and Steenkamp, J.B.E. (2006), "Marketing renaissance: how research in emerging markets advances marketing science and practice", *International Journal of Research in Marketing*, Vol. 23 No. 4, pp. 337-356.
- Burke, M. and Kraut, R.E. (2016), "The Relationship between Facebook use and well-being depends on communication type and tie strength: Facebook and well-being", *Journal of Computer-Mediated Communication*, Vol. 21 No. 4, pp. 265-281.
- Carrigan, M., Marinova, S. and Szmigin, I. (2005), "Ethics and international marketing: research background and challenges", *International Marketing Review*, Vol. 22 No. 5, pp. 481-493.
- Coretti, S., Rumi, F. and Cicchetti, A. (2019), "The social cost of major depression: a systematic review", *Review of European Studies*, Vol. 11 No. 1, pp. 73-85.
- Coyne, S.M., Rogers, A.A., Zurcher, J.D., Stockdale, L. and Booth, M. (2020), "Does time spent using social media impact mental health?: an eight year longitudinal study", *Computers in Human Behavior*, Vol. 104, p. 106160.
- Cunningham, S., Hudson, C.C. and Harkness, K. (2021), "Social media and depression symptoms: a meta-analysis", *Research on Child and Adolescent Psychopathology*, Vol. 49, pp. 241-253.
- Datu, J., Valdez, J. and Datu, N. (2012), "Does Facebooking make us sad? Hunting relationship between Facebook use and depression among Filipino adolescents", *International Journal of Research Studies in Educational Technology*, Vol. 1 No. 2, pp. 83-91.
- Davidson, R. and MacKinnon, J.G. (1993), *Estimation and Inference in Econometrics*, Oxford University Press, New York.
- Davila, J., Hershenberg, R., Feinstein, B.A., Gorman, K., Bhatia, V. and Starr, L.R. (2012), "Frequency and quality of social networking among young adults: associations with depressive symptoms, rumination, and corumination", *Psychology of Popular Media Culture*, Vol. 1 No. 2, pp. 72-86.
- De Mooij, M. (2015), "Cross-cultural research in international marketing: clearing up some of the confusion", *International Marketing Review*, Vol. 32 No. 6, pp. 646-662.
- de Oliveira Santini, F., Ladeira, W.J., Pinto, D.C., Herter, M.M., Sampaio, C.H. and Babin, B.J. (2020), "Customer engagement in social media: a framework and meta-analysis", *Journal of the Academy of Marketing Science*, Vol. 48, pp. 1211-1228.

- Durkheim, E. (1893), *De la Division du Travail Social: Étude sur l'Organisation des Sociétés Supérieures*, F. Alcan. (Translated, 1933, by George Simpson), 4th Printing, 1960, The Macmillian Company, Paris.
- Durkheim, E. (1897), *Suicide: A Study in Sociology*, English Translation, Routledge, London.
- Eaton, W.W., Alexandre, P., Kessler, R.C., Martins, S.S., Mortensen, P.B., Rebok, G.W., Storr, C.L. and Roth, K. (2012), "The population dynamics of mental disorders", in Eaton, W.W. (Ed.), *Public Mental Health*, Oxford University Press, Oxford, pp. 125-150.
- Edvardsson, B., Tronvoll, B. and Gruber, T. (2011), "Expanding understanding of service exchange and value co-creation: a social construction approach", *Journal of the Academy of Marketing Science*, Vol. 39 No. 2, pp. 327-339.
- Eteokleous, P.P., Leonidou, L.C. and Katsikeas, C.S. (2016), "Corporate social responsibility in international marketing: review, assessment, and future research", *International Marketing Review*, Vol. 33 No. 4, pp. 580-624.
- Fardouly, J., Magson, N.R., Rapee, R.M., Johnco, C.J. and Oar, E.L. (2020), "The use of social media by Australian preadolescents and its links with mental health", *Journal of Clinical Psychology*, Vol. 76 No. 7, pp. 1304-1326.
- Feinstein, B.A., Hershenberg, R., Bhatia, V., Latack, J.A., Meuwly, N. and Davila, J. (2013), "Negative social comparison on Facebook and depressive symptoms: rumination as a mechanism", *Psychology of Popular Media Culture*, Vol. 2 No. 3, pp. 161-170.
- Franke, G.R. and Richey, R.G. (2010), "Improving generalizations from multi-country comparisons in international business research", *Journal of International Business Studies*, Vol. 41 No. 8, pp. 1275-1293.
- Freeman, L.C. (2004), *The Development of Social Network Analysis*, Empirical Press, Vancouver, BC.
- Frison, E. and Eggermont, S. (2016), "Exploring the relationships between different types of Facebook use, perceived online social support, and adolescents' depressed mood", *Social Science Computer Review*, Vol. 34 No. 2, pp. 153-171.
- Gámez-Guadix, M. (2014), "Depressive symptoms and problematic Internet use among adolescents: analysis of the longitudinal relationships from the cognitive-behavioral model", *Cyberpsychology, Behavior, and Social Networking*, Vol. 17 No. 11, pp. 714-719.
- Giddings, F.H. (1896), *The Principles of Sociology: An Analysis of the Phenomena of Association and of Social Organization*, Macmillan, Norwood, MA.
- Gilbert, E. and Karahalios, K. (2009), "Predicting tie strength with social media", *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 211-220.
- Gilbert, E., Karahalios, K. and Sandvig, C. (2008), "The network in the garden: an empirical analysis of social media in rural life", *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI)*, Vol. 08, pp. 1603-1612.
- Granovetter, M.S. (1973), "The strength of weak ties", *American Journal of Sociology*, Vol. 78 No. 6, pp. 1360-1380.
- Guo, C.J., Warkentin, M., Luo, X.R., Gurung, A. and Shim, J.P. (2020), "An imposed etic approach with Schwartz polar dimensions to explore cross-cultural use of social network services", *Information and Management*, Vol. 57 No. 8, p. 103261.
- Hanprathet, N., Manwong, M., Khumsri, J., Yingyeun, R. and Phanasathit, M. (2015), "Facebook addiction and its relationship with mental health among Thai high school students", *Journal of the Medical Association of Thailand*, Vol. 98 No. 3, pp. S81-S90.
- HDR (2018), "Human development report", United Nations Development Programme available at: <http://hdr.undp.org/en/indicators/103006> (accessed 21 December 2021).
- Hofstede, G. (2001), *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations*, Sage Publications, Thousand Oaks, CA.

- Huang, C. (2017), "Time spent on social network sites and psychological well-being: a meta-analysis", *Cyberpsychology, Behavior, and Social Networking*, Vol. 20 No. 6, pp. 346-354.
- Hultman, M., Robson, M.J. and Katsikeas, C.S. (2009), "Export product strategy fit and performance: an empirical investigation", *Journal of International Marketing*, Vol. 17 No. 4, pp. 1-23.
- Idrovo, A.J. (2011), "Three criteria for ecological fallacy", *Environmental Health Perspectives*, Vol. 119 No. 8, pp. a332-a332.
- Ivie, E.J., Pettitt, A., Moses, L.J. and Allen, N.B. (2020), "A meta-analysis of the association between adolescent social media use and depressive symptoms", *Journal of Affective Disorders*, Vol. 275, pp. 165-174.
- Jacobson, R. (1990), "Unobservable effects and business performance: reply to the comments of Boulding and Buzzell", *Marketing Science*, Vol. 9 No. 1, pp. 92-95.
- Jelenchick, L.A., Eickhoff, J.C. and Moreno, M.A. (2013), "Facebook depression? Social networking site use and depression in older adolescents", *Journal of Adolescent Health*, Vol. 52 No. 1, pp. 128-130.
- Jensen, M., George, M.J., Russell, M.R. and Odgers, C.L. (2019), "Young adolescents' digital technology use and mental health symptoms: little evidence of longitudinal or daily linkages", *Clinical Psychological Science*, Vol. 7 No. 6, pp. 1416-1433.
- Jönsson, B. and Bebbington, P. (1994), "What price depression?: the cost of depression and the cost-effectiveness of pharmacological treatment", *British Journal of Psychiatry*, Vol. 164 No. 5, pp. 665-673.
- Johnson, W. and Krueger, R.F. (2006), "How money buys happiness: genetic and environmental processes linking finances and life satisfaction", *Journal of Personality and Social Psychology*, Vol. 90 No. 4, pp. 680-691.
- Karim, F., Oyewande, A.A., Abdalla, L.F., Ehsanullah, R.C. and Khan, S. (2020), "Social media use and its connection to mental health: a systematic review", *Cureus*, Vol. 12 No. 6, e8627.
- Keles, B., McCrae, N. and Grealish, A. (2020), "A systematic review: the influence of social media on depression, anxiety and psychological distress in adolescents", *International Journal of Adolescence and Youth*, Vol. 25 No. 1, pp. 79-93.
- Kelly, Y., Zilanawala, A., Booker, C. and Sacker, A. (2018), "Social media use and adolescent mental health: findings from the UK Millennium Cohort Study", *EClinicalMedicine*, Vol. 6, pp. 59-68.
- Kessler, R.C. and Bromet, E.J. (2013), "The epidemiology of depression across cultures", *Annual Review of Public Health*, Vol. 34, pp. 119-138.
- Kotler, P. (2018), "Should government regulate questionable goods and services?", in Atul Parvatiyar, A. and Sisodia, R. (Eds), *Handbook of Advances in Marketing in an Era of Disruptions: Essays in Honour of Jagdish N. Sheth*, SAGE Publications, New Delhi, pp. 51-63.
- Kübler, R., Pauwels, K., Yildirim, G. and Fandrich, T. (2018), "App popularity: where in the world are consumers most sensitive to price and user ratings?", *Journal of Marketing*, Vol. 82 No. 5, pp. 20-44.
- Kumar, A., Bezawada, R., Rishika, R., Janakiraman, R. and Kannan, P.K. (2016), "From social to sale: the effects of firm-generated content in social media on customer behavior", *Journal of Marketing*, Vol. 80 No. 1, pp. 7-25.
- Lamberton, C. and Stephen, A.T. (2016), "A thematic exploration of digital, social media, and mobile marketing: research evolution from 2000 to 2015 and an agenda for future inquiry", *Journal of Marketing*, Vol. 80 No. 6, pp. 146-172.
- Lee, J.W. and Lee, H. (2016), "Human capital in the long run", *Journal of Development Economics*, Vol. 122, pp. 147-169.
- Li, J.B., Lau, J.T., Mo, P.K., Su, X.F., Tang, J., Qin, Z.G. and Gross, D.L. (2017), "Insomnia partially mediated the association between problematic Internet use and depression among secondary school students in China", *Journal of Behavioral Addictions*, Vol. 6 No. 4, pp. 554-563.

- Li, F., Larimo, J. and Leonidou, L.C. (2021), "Social media marketing strategy: definition, conceptualization, taxonomy, validation, and future agenda", *Journal of the Academy of Marketing Science*, Vol. 49 No. 1, pp. 51-70.
- Lin, C.A. (1993), "Exploring the role of VCR use in the emerging home entertainment culture", *Journalism Quarterly*, Vol. 70 No. 4, pp. 833-842.
- Lin, L.Y., Sidani, J.E., Shensa, A., Radovic, A., Miller, E., Colditz, J.B. and Primack, B.A. (2016), "Association between social media use and depression among US young adults", *Depression and Anxiety*, Vol. 33 No. 4, pp. 323-331.
- Lukoff, K. (2019), "Digital well-being is way more than just reducing screen time", available at: <https://uxdesign.cc/digital-wellbeing-more-than-just-reducing-screen-time-46223db9f057> (accessed 21 December 2021).
- Lup, K., Trub, L. and Rosenthal, L. (2015), "Instagram# instasad?: exploring associations among Instagram use, depressive symptoms, negative social comparison, and strangers followed", *Cyberpsychology, Behavior, and Social Networking*, Vol. 18 No. 5, pp. 247-252.
- Marino, C., Gini, G., Vieno, A. and Spada, M.M. (2018), "The associations between problematic Facebook use, psychological distress and well-being among adolescents and young adults: a systematic review and meta-analysis", *Journal of Affective Disorders*, Vol. 226, pp. 274-281.
- McCrae, N., Gettings, S. and Purssell, E. (2017), "Social media and depressive symptoms in childhood and adolescence: a systematic review", *Adolescent Research Review*, Vol. 2 No. 4, pp. 315-330.
- McFarlane, G. (2021), "How Facebook (Meta), Twitter, social media make money from you", available at: <https://www.investopedia.com/stock-analysis/032114/how-facebook-twitter-social-media-make-money-you-twtr-lnkd-fb-goog.aspx> (accessed 21 December 2021).
- Morin-Major, J.K., Marin, M.F., Durand, N., Wan, N., Juster, R.P. and Lupien, S.J. (2016), "Facebook behaviors associated with diurnal cortisol in adolescents: is befriending stressful?", *Psychoneuroendocrinology*, Vol. 63, pp. 238-246.
- Nesi, J. and Prinstein, M.J. (2015), "Using social media for social comparison and feedback- seeking: gender and popularity moderate associations with depressive symptoms", *Journal of Abnormal Child Psychology*, Vol. 43 No. 8, pp. 1427-1438.
- O'Dea, B. and Campbell, A. (2011), "Online social networking amongst teens: friend or foe?", *Annual Review of Cybertherapy and Telemedicine*, Vol. 9 No. 1, pp. 133-138.
- Okazaki, S. and Taylor, C.R. (2013), "Social media and international advertising: theoretical challenges and future directions", *International Marketing Review*, Vol. 30 No. 1, pp. 56-71.
- Orlowski, J. (2020), *The Social Dilemma*, Exposure Labs, Boulder, CO, Netflix, available at: <https://www.netflix.com/title/81254224>.
- Pantic, I., Damjanovic, A., Todorovic, J., Topalovic, D., Bojovic-Jovic, D., Ristic, S. and Pantic, S. (2012), "Association between online social networking and depression in high school students: behavioral physiology viewpoint", *Psychiatria Danubina*, Vol. 24 No. 1, pp. 90-93.
- Papies, D., Ebbes, P. and Van Heerde, H.J. (2017), "Addressing endogeneity in marketing models", in Leeftang, P., Wieringa, J., Bijmolt, T. and Pauwels, K. (Eds), *Advanced Methods for Modeling Markets. International Series in Quantitative Marketing*, Springer, Cham, pp. 28-38.
- Patel, V., Burns, J.K., Dhingra, M., Tarver, L., Kohrt, B.A. and Lund, C. (2018), "Income inequality and depression: a systematic review and meta-analysis of the association and a scoping review of mechanisms", *World Psychiatry*, Vol. 17 No. 1, pp. 76-89.
- Primack, B.A., Shensa, A., Sidani, J.E., Escobar-Viera, C.G. and Fine, M.J. (2021), "Temporal associations between social media use and depression", *American Journal of Preventive Medicine*, Vol. 60 No. 2, pp. 179-188.
- Rosen, L.D., Whaling, K., Rab, S., Carrier, L.M. and Cheever, N.A. (2013), "Is Facebook creating 'iDisorders'? The link between clinical symptoms of psychiatric disorders and technology use, attitudes and anxiety", *Computers in Human Behavior*, Vol. 29 No. 3, pp. 1243-1254.

- Rubera, G., Ordanini, A. and Griffith, D.A. (2011), "Incorporating cultural values for understanding the influence of perceived product creativity on intention to buy: an examination in Italy and the US", *Journal of International Business Studies*, Vol. 42 No. 4, pp. 459-476.
- Schwartz, S.H. (1994), "Beyond individualism/collectivism: new cultural dimensions of values", in Kim, U., Triandis, H.C., Kagitcibaşı, C., Choi, S.C. and Yoon, G. (Eds), *Individualism and Collectivism: Theory, Method, and Applications*, Sage Publications, Thousand Oaks, CA, pp. 85-119.
- Schwartz, S.H. (2006), "A theory of cultural value orientations: explication and applications", *Comparative Sociology*, Vol. 5 Nos 2-3, pp. 137-182.
- Scott, J. (1988), "Social network analysis", *Sociology*, Vol. 22 No. 1, pp. 109-127.
- Seabrook, E.M., Kern, M.L. and Rickard, N.S. (2016), "Social networking sites, depression, and anxiety: a systematic review", *JMIR Mental Health*, Vol. 3 No. 4, e5842.
- Selfhout, M.H., Branje, S.J., Delsing, M., ter Bogt, T.F. and Meeus, W.H. (2009), "Different types of Internet use, depression, and social anxiety: the role of perceived friendship quality", *Journal of Adolescence*, Vol. 32 No. 4, pp. 819-833.
- Selvin, H.C. (1958), "Durkheim's suicide and problems of empirical research", *American Journal of Sociology*, Vol. 63 No. 6, pp. 607-619.
- Shensa, A., Sidani, J.E., Dew, M.A., Escobar-Viera, C.G. and Primack, B.A. (2018), "Social media use and depression and anxiety symptoms: a cluster analysis", *American Journal of Health Behavior*, Vol. 42 No. 2, pp. 116-128.
- Sheth, J.N. (2020), "Borderless media: rethinking international marketing", *Journal of International Marketing*, Vol. 28 No. 1, pp. 3-12.
- Simoncic, T.E., Kuhlman, K.R., Vargas, I., Houchins, S. and Lopez-Duran, N.L. (2014), "Facebook use and depressive symptomatology: investigating the role of neuroticism and extraversion in youth", *Computers in Human Behavior*, Vol. 40, pp. 1-5.
- Sortheix, F.M. and Schwartz, S.H. (2017), "Values that underlie and undermine well-being: variability across countries", *European Journal of Personality*, Vol. 31 No. 2, pp. 187-201.
- Stafford, M.R. and Pounders, K. (2021), "The power of advertising in society: does advertising help or hinder consumer well-being?", *International Journal of Advertising*, Vol. 40 No. 4, pp. 1-4.
- Steenkamp, J.B.E. (2001), "The role of national culture in international marketing research", *International Marketing Review*, Vol. 18 No. 1, pp. 30-44.
- Steers, M.L.N., Wickham, R.E. and Acitelli, L.K. (2014), "Seeing everyone else's highlight reels: how Facebook usage is linked to depressive symptoms", *Journal of Social and Clinical Psychology*, Vol. 33 No. 8, pp. 701-731.
- Stordal, E., Bjartveit Krüger, M., Dahl, N.H., Krüger, Ø., Mykletun, A. and Dahl, A.A. (2001), "Depression in relation to age and gender in the general population: the Nord-Trøndelag Health Study (HUNT)", *Acta Psychiatrica Scandinavica*, Vol. 104 No. 3, pp. 210-216.
- Tandoc, E.C. Jr, Ferrucci, P. and Duffy, M. (2015), "Facebook use, envy, and depression among college students: is Facebooking depressing?", *Computers in Human Behavior*, Vol. 43, pp. 139-146.
- Tang, T., Fang, E. and Wang, F. (2014), "Is neutral really neutral? The effects of neutral user-generated content on product sales", *Journal of Marketing*, Vol. 78 No. 4, pp. 41-58.
- Teo, A.R., Chan, B.K., Saha, S. and Nicolaidis, C. (2019), "Frequency of social contact in-person vs on Facebook: an examination of associations with psychiatric symptoms in military veterans", *Journal of Affective Disorders*, Vol. 243, pp. 375-380.
- Thorisdottir, I.E., Sigurvinsdottir, R., Kristjansson, A.L., Allegrante, J.P., Lilly, C.L. and Sigfusdottir, I.D. (2020), "Longitudinal association between social media use and psychological distress among adolescents", *Preventive Medicine*, Vol. 141, p. 106270.
- Tiggemann, M. and Slater, A. (2015), "The role of self-objectification in the mental health of early adolescent girls: predictors and consequences", *Journal of Pediatric Psychology*, Vol. 40 No. 7, pp. 704-711.

- 
- Tsitsika, A.K., Tzavela, E.C., Janikian, M., Ólafsson, K., Iordache, A., Schoenmakers, T.M. and Richardson, C. (2014), "Online social networking in adolescence: patterns of use in six European countries and links with psychosocial functioning", *Journal of Adolescent Health*, Vol. 55 No. 1, pp. 141-147.
- Twenge, J.M. (2017), *iGen: Why Today's Super-connected Kids Are Growing up Less Rebellious, More Tolerant, Less Happy-And Completely Unprepared for Adulthood-And what that Means for the Rest of Us*, Simon & Schuster, New York, NY.
- Twenge, J.M. (2020), "Why increases in adolescent depression may be linked to the technological environment", *Current Opinion in Psychology*, Vol. 32, pp. 89-94.
- Twenge, J.M., Spitzberg, B.H. and Campbell, W.K. (2019), "Less in-person social interaction with peers among US adolescents in the 21st century and links to loneliness", *Journal of Social and Personal Relationships*, Vol. 36 No. 6, pp. 1892-1913.
- Van den Eijnden, R.J., Meerkerk, G.J., Vermulst, A.A., Spijkerman, R. and Engels, R.C. (2008), "Online communication, compulsive Internet use, and psychosocial well-being among adolescents: a longitudinal study", *Developmental Psychology*, Vol. 44 No. 3, pp. 655-665.
- Van Dijck, J. (2013), *The Culture of Connectivity: A Critical History of Social Media*, Oxford University Press, Oxford.
- Verduyn, P., Lee, D.S., Park, J., Shablack, H., Orvell, A., Bayer, J. and Kross, E. (2015), "Passive Facebook usage undermines affective well-being: experimental and longitudinal evidence", *Journal of Experimental Psychology: General*, Vol. 144 No. 2, pp. 480-488.
- Vernon, L., Modecki, K.L. and Barber, B.L. (2017), "Tracking effects of problematic social networking on adolescent psychopathology: the mediating role of sleep disruptions", *Journal of Clinical Child and Adolescent Psychology*, Vol. 46 No. 2, pp. 269-283.
- Vidal, C., Lhaksampa, T., Miller, L. and Platt, R. (2020), "Social media use and depression in adolescents: a scoping review", *International Review of Psychiatry*, Vol. 32 No. 3, pp. 235-253.
- Wang, P., Wang, X., Wu, Y., Xie, X., Wang, X., Zhao, F. and Lei, L. (2018), "Social networking sites addiction and adolescent depression: a moderated mediation model of rumination and self-esteem", *Personality and Individual Differences*, Vol. 127, pp. 162-167.
- Wellman, B. and Wortley, S. (1990), "Different strokes from different folks: community ties and social support", *American Journal of Sociology*, Vol. 96 No. 3, pp. 558-588.
- WHO (2017), *Depression and Other Common Mental Disorders: Global Health Estimates*, World Health Organization, Geneva.
- Wilkinson, R.G. and Pickett, K.E. (2006), "Income inequality and population health: a review and explanation of the evidence", *Social Science and Medicine*, Vol. 62 No. 7, pp. 1768-1784.
- Yaprak, A. (2008), "Culture study in international marketing: a critical review and suggestions for future research", *International Marketing Review*, Vol. 25 No. 2, pp. 215-229.
- Zhang, J. and Centola, D. (2019), "Social networks and health: new developments in diffusion, online and offline", *Annual Review of Sociology*, Vol. 45, pp. 91-109.

### Corresponding author

Goksel Yalcinkaya can be contacted at: [goksel.yalcinkaya@unh.edu](mailto:goksel.yalcinkaya@unh.edu)

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