Do Social Media and Messaging Apps Influence Loneliness? The Case of Young Malaysian Higher Education Students during the COVID-19 Pandemic

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ABSTRACT

Research into the impact of social media on psychological well-being has produced conflicting findings, with a corresponding lack of certainty about the direction of the effect. Since early 2020, the COVID-19 pandemic has necessitated a re-assessment of the available evidence, also in Malaysia. The present study focuses on feelings of loneliness among unmarried young Malaysian adults, the so-called Generation Z, a demographic most likely to suffer mental health problems due to social confinement. An exploratory online survey (n = 103) was conducted to find out how lonely Malaysian youngsters are, focusing on those in higher education. To measure this, use was made of the UCLA Loneliness Scale. The main research question is whether loneliness relates to participants' usage of social networking sites (e.g. Instagram), messaging apps (e.g. WhatsApp) or their reasons for doing so (e.g., meeting diversion or affective needs). Results show that in Malaysia, young adults' feelings of loneliness under COVID restrictions vary independently of their social media and messaging app usage and the needs these digital technologies fulfil. Even the weak or moderate associations that were identified are likely due to chance factors. Our study supports, therefore, scholarship that questions the direct effect of social media platforms on loneliness regardless of the role they play in promoting meaningful in-person interactions. Possible explanations and implications of these findings will be discussed. One conjecture is that Malaysia's shared cultural values might form a buffer against adverse well-being effects of both the pandemic and SMMA usage.

Keywords: *Social media, loneliness, young adults, COVID-19, Malaysia.*

INTRODUCTION

Social networking sites and messaging apps (SMMAs for short) are ubiquitous and pervasive technologies, promoting both online sociality and online creativity (e.g., Van Dijck, 2013, p. 9). However, in facilitating these gratifications, SMMAs have also become associated – as a risk factor – with negative mental health consequences. Previous research into the impact of social media on loneliness, shyness, anxiety, depression and similar psychological attributes and disorders has produced conflicting findings. Despite a wealth of data and an ever-growing body of knowledge, the picture remains complex, with many personality traits and situational variables to consider.

Talking of the latter, since early 2020, the COVID-19 pandemic has become a major circumstantial factor, requiring an update and re-assessment of the evidence in Malaysia. To quote *The Lancet*, "[t]he emergence of the COVID-19 pandemic has created an environment where many determinants of poor mental health are exacerbated" (Santomauro et al., 2021, p. 1). Similarly, Banks et al.'s (2021, p. 109) review concluded that "the COVID-19 pandemic has been associated with a substantial rise in symptoms of mental ill-health" (see also Xiong et al., 2020). It is important to (re-)examine, therefore, whether SMMAs are a determinant of

mental ill-health – and perceived loneliness in particular – and if so, to what extent that relationship has been affected by successive COVID-19 lockdowns of economic and social activities.

The present study will focus, more specifically, on the SMMA-loneliness relationship for young university and college students in Malaysia. The so-called Generation Z represents a population category most likely to suffer mental health problems due to social confinement (Bu et al., 2020; Lee et al., 2020; Xiong et al., 2020). González-Sanguino et al. (2021) even found that during the COVID-19 pandemic, loneliness is one of the main contributors to mental ill-health. A second justification for the current study is that being young and using SMMAs are two of the seven risk factors associated with distress under COVID-19 as identified in Xiong et al.'s (2020) analytical summary of the evidence; the others are female gender, student status, unemployment, the pre-existence of chronic and/or psychiatric illnesses and frequent exposure to news concerning COVID-19. Finally, there is a clear need also to study geographic and demographic categories other than adults in the industrialised West (e.g., Okabe-Miyamoto & Lyubomirsky, 2021, p. 146). Research into young Malaysian students may thus lead to "alternative plausible explanations" and help uncover "critical moderators to reconcile conflicting findings" (Banks et al., 2021, p. 109).

It is generally agreed that the COVID-19 pandemic has negatively affected people's psychological well-being, including their sense of social connectedness. Increased loneliness during lockdown has been reported by, among others, Palgi et al. (2020), Van Tilburg et al. (2020) and Bonsaksen et al. (2021). Whether or not loneliness has become more prevalent and/or severe, the effects on overall mental health are just as detrimental. Okabe-Miyamoto and Lyubomirsky (2021, p. 10) report lower psychological well-being among "people whose sense of loneliness increased [during the pandemic] and whose social support was reduced".

As far as Malaysia is concerned, the Ministry of Health does not track loneliness on its own, focusing instead on anxiety, major depressive disorders and suicidality. The most recent data can be found in the *Malaysian Mental Healthcare Performance – Technical Report 2016* (Ministry of Health Malaysia, 2017); it draws attention to the high prevalence of depression, which – before COVID-19 – stood at 1.8% of the population, with women proportionately more affected than men. A nationwide online survey conducted during COVID-19 (Wong et al., 2021) shows high percentages of reported depressive and anxiety symptoms (59.2% and 55.1% respectively). Age and gender have turned out to be important demographic moderators alongside occupation type: females and young people – particularly students – are more likely to display mental health symptoms (Okabe-Miyamoto & Lyubomirsky, 2021, p. 134; Wong et al., 2021). Sundarasen et al. (2020) report that with the current pandemic, almost one-third of university students experienced anxiety: 20.4% "minimum to moderate", 6.6% "marked to severe" and 2.8% "most extreme". As anxiety and loneliness are interrelated (e.g., O'Day & Heimberg, 2021, p. 3), this breakdown gives an approximate idea of how lonely young Malaysian students may feel. Whether their experience of loneliness – if any – relates to their SMMA usage will be further explored in the review of the literature.

Vulnerabilities need not develop into major mental disorders or result in suicide, especially if there are no pre-existing, clinically diagnosed mental health conditions (Okabe-Miyamoto & Lyubomirsky, 2021, p. 134). Even so, in tandem with the observed increase in mental health symptoms, Malaysia has seen a considerable rise in suicide cases, also within the at-risk groups, with an average of 94 cases per month in the first half of 2021 compared to 51 per month in 2019 (e.g., Ganaprakasam et al., 2021). It is against this background that

our study examines the usage of social media and messaging apps (SMMA-U), the needs these social media and messaging apps fulfil (SMMA-N) and their association with loneliness (LON). Correlational research of this nature can inform evidence-based interventions for managing the mental health challenges associated with SMMA use and needs.

Before continuing, "loneliness" will be taken to refer to "an unpleasant experience that emerges when a person's network of social interactions is severely lacking in some essential manner, either quantitatively or qualitatively" (Peplau & Perlman, 1982, p. 31). This severe lack can be conceptualised as a discrepancy between someone's actual social relationships and their desired ones (see, e.g., Blazer, 2002). Though a different construct, it is no surprise that social isolation tends to be closely associated with loneliness (e.g., Groarke et al., 2020) and is sometimes even used as a loose synonym. For present purposes, it is also essential to know that loneliness is a component of an overall measure of well-being (e.g., Kross et al., 2021, p. 56), which in its turn contributes to mental health (World Health Organization, 2018), i.e., "a state of well-being in which an individual realises his or her abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community."

A second key concept is social media and messaging apps (SMMA). Following Ohme et al. (2020, p. 5) and Hopkins and Hooi (2021, p. 1), we will distinguish social media platforms (social networking sites) – such as Facebook – from messaging applications (communication apps or mobile messengers) – such as WhatsApp. Currently, 88.7% of Malaysia's population are Internet users, 46.0% of whom are 20–29 years old; SMMA penetration is high, with Facebook and WhatsApp the most widely used services – respectively 91.7% and 98.7% of all users in each category (Malaysian Communications and Multimedia Commission, 2021).

For reasons of space, we will assume familiarity with Uses and Gratifications Theory (UGT) (Katz et al., 1974), the framework within which the present study is situated. The core idea is that different media – including today's communication technologies – afford different gratifications for different social and psychological user types. Preferences for specific SMMAs are motivated by individuals' needs and their active, purposeful pursuit to meet those needs. Though meant to put mass media consumption into a more goal-driven, consumer-centred perspective in the 1970s, UGT has proven resilient enough to accommodate more recent needs to do with the Web 2.0 revolution, specifically, user-generated content and online participatory interaction. To describe those needs, we will be using the original five use-gratification categories: cognitive, affective, personal integrative, socially integrative and tension release (or diversion) needs (e.g., Katz et al., 1973). It also follows that the theoretical psychological perspective within which we examine SMMA's association with loneliness is the social network approach, with its focus on patterned social interaction and the flow of resources, and the gratification of needs (House & Kahn, 1985).

As a final introductory point, though the research will be based on a questionnaire survey, the objective is not to arrive at generalisations about a particular target population – for example, young Malaysians – but to develop a more evidence-based sense of the SMMA-loneliness association under lockdown conditions. Because of the nearly complete lack of Malaysian research in this topic area, the study was conceived and conducted with a view to generating new hypotheses – rather than testing existing ones – and in doing so, to confirm or disconfirm the findings from the prior predominantly Western scholarship.

LITERATURE REVIEW

As observed just now, this brief literature summary is meant to provide a benchmark against which to interpret the Malaysian findings. The need for the current study follows from the lack of Malaysian research rather than an original synthesis of the existing body of knowledge. The literature on social media interaction and mental health is not only substantial and growing fast but also heterogeneous, multifaceted and fragmented, with many contrary findings and few generalizations. Moreover, Clark et al. (2018, p. 35) observe that most of the literature is correlational, with no absolute claims for any causality between SMMA and loneliness in either direction. An early study by Vergeer and Pelzer (2009) could not establish a direct or reverse causal relationship between loneliness and social media use. In this section, the focus will be on the evidence for both positive and negative outcomes. Note that we did not locate any Malaysian survey study covering the same research niche except to some extent for Alias et al. (2021), which examines Internet addiction as a predictor of loneliness; nor did we find any study claiming that there is no relationship whatsoever among SMMA use, SMMA needs, loneliness and the COVID-19 pandemic.

Positive Outcomes
There is considerable evidence for claiming that SMMAs benefit users' psychological well-being, the principal reason being that SMMAs create opportunities for social connectedness and social support (e.g., Lange, 2021, p. 33; O'Day & Heimberg, 2021; Okabe-Miyamoto & Lyubomirsky, 2021; Taylor-Jackson et al., 2021). There are, however, two qualifications to this general claim which are immediately relevant to our study.

First, well-being effects vary as a function of different media user groups (e.g., Jaidka, 2022). In this respect, an important distinction should be made between active and passive users of SMMAs. Basically, only active SMMA usage has been associated with higher psychological well-being (Seabrook et al., 2016; Verduyn et al., 2017) and, more specifically, with lower levels of loneliness (Lin et al., 2016). Conversely, no such beneficial effects have been shown to accrue to passive SMMA usage, i.e. behaviours such as "lurking" or browsing without interacting or sharing content (Brandtzæg, 2010, p. 952). Note that in Brandtzæg's (2010) media-user typology, active users would correspond to socializers and instrumental or advanced users, all of which display medium-to-high frequency of use across a medium-to-high variety of SMMAs. On the distinction between active and passive users, see Escobar-Viera et al. (2018).

A second powerful moderator to emerge from the prior scholarship is the needs, goals and motivations that guide SMMA behaviour. There is accumulating evidence that "social media can enhance or diminish well-being depending on how people use them" (Kross et al., 2021, p. 55). More specifically, SMMAs prevent or mitigate loneliness when they promote meaningful social connectedness, most typically by improving social support (e.g., Deters & Mehl, 2012; Cotton et al., 2013; Boniwell et al., 2015; Huang, 2016; Seo et al., 2016; Yang, 2019; Dumas et al., 2017; Clark et al., 2018; Groarke et al., 2020). Arguably, the need for social interaction is critical during COVID-19 lockdowns. Okabe-Miyamoto and Lyubomirsky (2021, p. 139) put it, "social connection is vital in times of stress, such as a global pandemic, and many may use social media to connect with others while at a physical distance." As such, limited or temporary SMMA use can be a useful "coping strategy" with positive mental health outcomes (Eden et al., 2020).

Negative Outcomes

It follows from the previous subsection that *passive* SMMA users and those whose SMMA activities do *not* promote social connectedness are more likely to experience adverse mental health effects, supporting claims that social media use (SMU) and loneliness must be directly related. Okabe-Miyamoto and Lyubomirsky (2021, p. 139), however, found that the current state of knowledge only "*seems to point to* social media having detrimental psychological outcomes" [italics ours]. O'Day and Heimberg's (2021, p. 3) equally comprehensive review of the literature is even more tentative in its conclusion: "it is not yet understood whether certain types of SMU (e.g., passive scrolling, active broadcasting of information without engaging others) may exacerbate loneliness," and in the case of problematic SMU, whether these SMMA types "also predict loneliness."

Perceived loneliness is only one facet of psychological well-being (Kross et al., 2021, p. 56) and findings for the more general construct do not necessarily apply to it in the same way. Much depends on the presence of certain risk factors associated with lower well-being. Okabe-Miyamoto and Lyubomirsky (2021, p. 134) distinguish four types: psychological (e.g., anxiety), social (e.g., loneliness), circumstantial (e.g., financial insecurity) and social media time use. As for the latter, one of the consistent findings is that consulting online news about COVID-19 contributes to worse psychological well-being; there is not just the potential for information overdose but also exposure to intimidating misinformation, both compounded by a social media context of already strong negative sentiment (Okabe-Miyamoto & Lyubomirsky, 2021, p. 139). It is not obvious, however, if the detrimental effect on well-being also entails a higher incidence and/or higher severity of loneliness.

As for the research on loneliness, the most recent study we consulted is Groarke et al.'s (2020) online survey. Interestingly, no direct mention is made of SMMA use or SMMA needs, and neither does SMMA feature as a protective or risk factor. By contrast, Song et al.'s (2014) meta-analysis of the pre-pandemic evidence found a positive relationship between Facebook and loneliness. This is especially true for immoderate use of Facebook and other social networking sites, with most evidence dating before COVID-19. As in the subsection above, whether SMMAs lead to adverse effects on well-being depends on the needs they are meant to gratify. Without going into detail, "fear of missing out", seeking social validation (e.g., likes) and social comparison have all been shown to affect well-being for the worse (e.g., Odacı & Kalkan, 2010; Pittman & Reich, 2016; Barry et al., 2017; Hunt et al., 2018; Barry & Wong, 2020; Gupta & Sharma, 2021; O'Day & Heimberg, 2021). A stronger sense of loneliness has also long been associated with time spent online at the expense of in-person social interaction (Kraut et al., 1998; Morahan-Martin, 1999; Nie & Hillygus, 2002). Finally, although Alias et al.'s (2021) Malaysian survey study did find a statistically significant relationship between loneliness and Internet addiction among university students (n = 169, aged 19–22), it is doubtful this finding can be extrapolated to SMMA use.

METHODOLOGY

Participants

The survey study is based on a total of 103 unmarried young Malaysians aged 19–29. The participants are predominantly female (72.8%); the majority are attending college or university (71.8%) and live at home with their families (83.5%); most of these households consist of four or more members (84.7%). Half of the sample lives in the more densely populated, urbanised areas of Kuala Lumpur and Selangor (50.5%), with a sizeable number

also from Kelantan (22.3%). Monthly household income is less than RM4,850 for 78.2% of the respondents. For most, the highest level of education is a diploma or degree (73.8%). More details can be found in Table 1. It follows that any findings and cautious generalisations will especially hold true for those participants who are female students in higher education living at home with their parents, siblings and perhaps other household and family members. In fact, no generalisation can be made beyond the sample.

Table 1: Sample characteristics (n = 103)

	N	%		N	%
Gender			*Employment*		
Male	27	26.5	Student	74	71.8
Female	75	72.5	Working	24	23.3
			Housewife	0	0.0
Education			Self-employed	5	4.9
Primary	1	0.9			
Lower secondary	0	0.0	*Household income (per month)*		
Upper secondary	12	11.7	Below RM4,850	79	78.2
Diploma	32	31.1	RM4,850-RM10,959	13	12.9
Degree	44	42.7	Above RM10,959	9	8.9
Master's/MPhil	10	9.7			
PhD	0	0.0	*Residence*		
Other	4	3.9	Johor	4	3.9
			Kedah	4	3.9
Living situation			Kelantan	23	22.3
With family	86	83.5	Kuala Lumpur	29	28.2
Alone	9	8.7	Labuan	0	0.0
With one or more friends	8	7.8	Melaka	1	0.9
Other	0	0.0	Negeri Sembilan	1	0.9
			Pahang	2	2.0
Size of family or household			Perak	2	2.0
1	3	3.1	Perlis	0	0.0
2	5	5.3	Pulau Pinang	2	2.0
3	19	20.0	Putrajaya	0	0.0
4-7	64	67.4	Sabah	1	0.9
8 and above	4	4.2	Sarawak	4	3.9
			Selangor	28	27.2
			Terengganu	2	2.0

Research design and sampling strategy require additional justification to avoid confusion about the scope and significance of the findings to be reported below. As was observed at the end of the introductory section, the main objective is not to generalise to a large, pre-defined target population but to understand an important recent social phenomenon within the unique context of Malaysian society. The initial idea driving the current study was to develop new insights, arrive at new conjectures and generate new hypotheses.

Though face-to-face oral interviews may be the norm when seeking in-depth answers from research participants, a written questionnaire was considered more suitable and convenient for three reasons. First, it made it possible to ask a relatively large number of short-answer questions in a structured manner. Secondly, at this stage of the project, it would guarantee the collaboration of a higher percentage of respondents in a shorter time. Thirdly,

the format could also accommodate the psychometric instrument used to measure loneliness.

Not every questionnaire is technically a survey or instrument, and many are methodologically closer to structured interviews administered in written form. For a more extensive discussion of the continuum between both research designs, see Vogt et al. (2012, p. 14 & pp. 33–35). In other words, the term "survey" is used in a somewhat informal way to refer to a form of data collection that has more in common with interviews than with the kind of large-scale questionnaire surveys typical of the hypothetico-deductive method used in the social sciences. Our sample size of 103 is more than sufficient, considering that "20 to 40 interviewees is a normal range" (Vogt et al., 2012, p. 149). Initially, the target population was rather broadly defined as young Malaysian adults, but in the absence of a suitable sampling frame, the only sensible research strategy to adopt was to over-sample first (hence, the 156 completed forms referred to below) to filter out the desired respondents.

Survey and Procedure

A survey questionnaire was developed to be completed online using the JotForms.com platform. The survey contained 57 questions, divided into four sections: demographics, usage of social media and messaging apps (SMMA-U), the needs these social media and messaging apps fulfil (SMMA-N) and loneliness. All questions were closed-ended. To guarantee collection of information-rich cases (Saunders et al., 2019, p. 323), respondents were recruited through a staged combination of snowball, purposive and homogeneous sampling through social media and email. An initial group of contacts helped spread the survey among their families, friends and acquaintances, which yielded 156 completed questionnaires (July 2021). Note that a similar data collection approach has been used in other COVID- or social media-related survey-based research in Malaysia (e.g., Sameer et al., 2020; Yuliani et al., 2020; Dou et al., 2021; Rashid et al., 2021). Given the study's research objectives, we extracted from that set the 103 respondents aged 19 to 29 years and unmarried, allowing us greater depth of analysis of this particular subgroup. Even so, the non-probability sampling means that the findings are exploratory rather than confirmatory. For a similar method, see Groarke et al. (2020), who argue that this approach is typical of research in the area.

Before sharing the survey link, a pilot study was conducted to test the instructions and questions regarding conciseness, correctness and clarity. Based on the feedback, the original 20-item instrument that we used in Section 3 (Ali et al., 2020) was slightly revised and only in minor ways, not affecting the reliability or validity of the scale. For instance, we changed the term "social networking sites" to "social media and messaging apps" as the two terms in this phrase are more widely understood outside academia. We also redid the list of social media and messaging apps in one of the scale items to reflect more accurately current preferences and usage patterns among Malaysians (Hopkins & Hooi, 2021; Kemp, 2021, p. 47; Mohammed et al., 2021).

Variables and Measures

The three key variables are (a) social media and messaging app usage (SMMA-U), (b) the needs fulfilled by using social media and messaging apps (SMMA-N) and (c) loneliness (LON).

a. Social Media and Messaging Apps – Usage

The survey captured information about the number of SMMA accounts each respondent has, overall time spent using SMMAs, time spent using specific SMMAs (e.g. Instagram, TikTok or WhatsApp), the frequency of checking SMMA accounts per day and how often they initiate SMMA interactions themselves rather than react to notifications, posts, uploads or messages. Time use especially has been found to impact psychological well-being, both positively and adversely (e.g., Okabe-Miyamoto & Lyubomirsky, 2021, p. 134). The responses were used to calculate a composite score which would give us an indication of which respondents qualify as heavy, moderate or light SMMA users. Note that frequent initiation of SMMA interactions – rather than scrolling or liking posts – is typical of active users.

b. Social Media and Messaging Apps – Needs

SMMAs gratify essential human needs like communication, self-expression, entertainment or information. To identify the level and types of gratification sought by young Malaysian SMMA users, we relied on a novel instrument recently developed by Ali et al. (2020), the Social Networking Sites and Usage & Needs (SNSUN) scale. For its reliability and validity test scores (correlations, Cronbach's alpha and CVI), see Ali et al. (2020).

The scale consists of 20 items, equally spread over five dimensions: diversion needs, cognitive needs, affective needs, personal integration needs and social integration needs (Katz et al., 1973). Respondents rate their agreement with statements such as "I use SMMAs to pass time when I am bored" (diversion) or "SMMAs enable me to get through to someone who is hard to reach" (integrative social needs). The scale uses a five-point Likert scale, starting from "strongly agree" (5) to "strongly disagree" (1). An SMMA-N score of, for example, 4.55 would mean that this respondent relies heavily – and for some, perhaps even primarily – on social media and messaging to fulfil all or most of the five types of needs; conversely, lower scores indicate less SMMA dependency with perhaps only one or two dominant needs (e.g. cognitive and social integrative needs).

c. Loneliness

The UCLA Loneliness Scale Version 3 (Russell et al., 1980) was used to measure social loneliness, i.e. subjective feelings of belonging (positive dimension) and perceived social isolation (negative dimension). The focus is on identifying "different qualitative features of [respondents'] social networks" rather than asking them direct questions about how lonely they feel; this so-called cognitive approach to loneliness reduces socially desirability bias (Weeks & Asher, 2012).

The UCLA scale consists of 20 questions, both positively and negatively worded ones (e.g. "How often do you feel outgoing and friendly?" and "How often do you feel isolated from others?"). In the survey, the scale questions were asked in random order; the survey respondents would answer them using a 4-point Likert scale ranging from "Never" (1) over "Rarely" (2) and "Sometimes" (3) to "Often" (4). Responses to the positively worded items were reverse-coded to obtain a total loneliness score. A high score of, for example, 3.30 would suggest severe loneliness, while lower scores would mean a respondent is either not lonely at all or only moderately lonely.

The revised UCLA Loneliness Scale is the "most widely used assessment in the adult literature" (Weeks & Asher, 2012). Reliability, internal consistency and validity have been extensively documented (see, among others, Russell et al., 1980). It is also more appropriate

as an outcome variable measure in this study than, for example, the De Jong-Gierveld Scale, which also includes overall and emotional loneliness items (De Jong Gierveld, 2006) or the Three-Item Loneliness Scale (TILS), which is somewhat less accurate (Hughes et al., 2004).

Data Analysis
Descriptive statistical analyses were performed on the sample to obtain a clearer understanding of its composition and characteristics. Measures of central tendency (means, medians and other percentiles) and dispersion (standard deviations, ranges) were computed for all predictor and outcome variables. Additionally, we calculated correlation values for the associations between LON and respectively SMMA-U and SMMA-N, using two-by-two contingency tables. Where not all the assumptions were met, the Pearson's chi-squared tests that were carried out should be interpreted with caution. Since purposive sampling – as in our study – is not the same as convenience sampling (Vogt et al., 2012, pp. 127 & 348), non-parametric inferential statistics are appropriate.

FINDINGS

Descriptive Findings

Table 2: Descriptive for SMMA-U, SMMA-N and LON

	SMMA-U score	SMMA-N score	LON score
Mean	3.60	3.84	2.30
Median	3.55	3.80	2.25
Mode	3.36	3.80	2.05
Standard Deviation	0.56	0.54	0.42
Range	2.91	2.95	2.05
Minimum	2.09	2.05	1.25
Maximum	5.00	5.00	3.30

The mean SMMA-U score of 3.60 (see Table 2) suggests that the Malaysian participants in the survey are generally heavy SMMA users. When looking at individual item responses (data not shown), they have an average of three social media and/or messaging apps – a statistic consistent with Melendi's (2020) comparison of Millennials and Generation Z. Respondents use their SMMAs "frequently" to "very frequently": most (66.0%) report spending three to six hours per day on their mobile phones, with just over half of them (53.4%) checking their SMMAs nine or more times a day. Their preferred device is the mobile phone: 97.09%, close to the near-saturation level of 98.7% reported by MCMC (2020). Young Malaysian higher education students are also active SMMA users: the most report that they initiate interactions "occasionally" or "(very) frequently" (87.2%), compared with their more passive counterparts who "never" or "rarely" do so (12.8%),

The survey also allows us to distinguish three broad categories of SMMAs based on respondents' summed "frequently" and "very frequently" ratings. The two most popular ones are WhatsApp and Instagram (85.4% and 83.5%), followed – at a distance – by Twitter and TikTok (46.5% and 43.1%) and – at an even greater distance – Facebook and Telegram (29.4% and 20.6%).

A similarly high average score was obtained for SMMA-N (3.84): most respondents "(strongly) agree" that social media platforms and messaging apps help them meet a wide variety of needs and gratifications. If responses are averaged by category, the following rank order appears: first, cognitive needs (4.36) and integrative social needs (4.04), next, diversion needs (3.88) and affective needs (3.65), and finally, the lowest score for personal integrative needs (3.25).

By contrast, the average score for perceived (social) loneliness is the lowest of all three variables: 2.30 on the 4-point scale used in the UCLA scale, which corresponds to 2.90 on a 5-point scale. The prevalence of loneliness is 16.50% (17/103) based on a cut-off point of 2.80, a score similar to the TILS one (e.g., Groarke et al., 2020). It follows that most young Malaysian respondents (83.50%) are only moderately lonely or not lonely at all. The LON range is also narrower than for SMMA-U and SMMA-N, with no extreme values at the top end of the scale. Note that for all three, however, standard deviations are equally low, giving a good indication of the accuracy of the mean as a summary statistic (Vogt et al., 2014, p. 210).

It follows that in our sample, neither active heavy usage of SMMAs nor high SMMA dependency – when it comes to fulfilling specific needs – seems to go hand in hand with more intense loneliness, despite the restrictions on social connectedness imposed by the COVID-19 pandemic.

Correlations
A similar and statistically more substantiated picture emerges when we conduct a pairwise comparison of Pearson's correlation values (see Table 3).

Table 3: Correlations for SMMA-U, SMMA-N and LON

	SMMA-U score	SMMA-N score	LON score
SMMA-U score	1		
SMMA-N score	0.427	1	
LON score	0.027	-0.151	1

The following three observations can be made. First, there is a moderately strong positive relationship between SMMA-U and SMMA-N (+0.427), meaning that heavier SMMA users would be more in agreement about the gratifications that SMMAs offer. As for the outcome variable LON, there is only a very weak positive relationship with SMMA-U (+0.027). A heavier SMMA user would not necessarily feel lonelier or *vice versa*. The conclusion seems to be that both vary independently of each other. Thirdly, SMMA-N and LON have a very weak negative relationship (-0.151), meaning that someone who more strongly agrees that SMMA fulfils diversion, cognition and/or affective needs as well as personal and/or integrative social needs is perhaps somewhat less likely to feel lonely. Since correlations do not tell in which direction an effect may work, this could also mean that the less lonely someone feels, the more strongly he or she will find gratification in the active use of social media and messaging apps.

It should be noted that these observations are tentative. Moreover, though the measurements that we use are scalar, the three constructs are not continuous but categorical variables. In spite of this, we can examine the associations in more statistical detail by turning to the chi-squared test – a distribution-free, non-parametric significance test.

Inferential Findings

After re-grouping the survey data for each of the three variables into two mutually exclusive categories ("low" and "high"), the following two-by-two contingency tables were arrived at.

Table 4: SMMA-U and LON

SMMA-U*LON	Low 1.00 - 2.49		High 2.50 - 4.00		Total	
Low 1.00 - 2.99	8	10.8%	4	13.8%	12	11.7%
High 3.00 - 5.00	66	89.2%	25	86.2%	91	88.3%
Total	74	100.0%	29	100.0%	103	100.0%

Table 4: SMMA-N and LON

SMMA-N*LON	Low 1.00 - 2.49		High 2.50 - 4.00		Total	
Low 1.00 - 2.99	2	2.7%	1	3.4%	3	2.9%
High 3.00 - 5.00	72	97.3%	28	96.6%	100	97.1%
Total	74	100.0%	29	100.0%	103	100.0%

The chi-square coefficients are 0.18 (SMMA-U*LON) and 0.04 (SMMA-N*LON); for both, the degree of freedom equals 1. Since the p-values are all higher than 0.05, neither of these statistics provide evidence of either an association, to begin with, or even if there were one, that it would be statistically significant.

It adds up to the fact that even the weak or moderate associations we reported above are highly likely due to chance factors. This provides further evidence for the overall conclusion that the predictor and outcome constructs vary independently of each other, and that the study has yielded so-called negative results. On the other hand, since the chi-squared test statistics do not "prove" the absence of an association or effect, results can also be interpreted as inconclusive, necessitating further research.

DISCUSSION

Results are doubly remarkable considering the COVID-19 context in which the survey was carried out and the demographic composition of the sample. The mean LON score (2.30) is low despite Malaysia's lockdowns and social confinement (e.g., Van Tilburg et al., 2020, – but see Luchetti et al., 2020). It is difficult to compare this score to the findings reported elsewhere: studies vary widely in how they define, measure and interpret loneliness as well as in their research methods, particularly their choice of population and sampling strategy. As for the loneliness prevalence rate of 16.50%, a comparison with previous research is equally challenging as definitions of young or early adulthood range from as low as 14 to as high as 49. Restricting ourselves to those age brackets closest to 19–29, Franssen et al. (2020) and Hossain et al. (2020) found loneliness prevalence rates among younger participants of respectively 39.7% and 24.0%. In other words, the rate attested in the current study is considerably lower; what is more, it is also considerably lower than some recent prevalence rates for the general population: 26.0% (Klein et al., 2021), 27.0% (Groarke et al., 2020) and 41.0% (Hossain et al., 2020) – but note the pre-COVID-19 rate of 10.5% reported by Beutel et al. (2017).

We also expected higher LON scores in view of our respondents' age (young), gender (predominantly female) and occupation (most of them are students); all three are known risk factors for mental health difficulties during the pandemic (Xiong et al., 2020), also in Malaysia (e.g., Sundarasen et al., 2020); younger age, in particular, is associated with higher loneliness

(Bu et al., 2020; Groarke et al., 2020). Moreover, respondents qualify as heavy SMMA users: 47.5% use social media and messaging apps "very frequently", with 36.9% spending five to six hours daily on their smartphones. Note that seven in ten respondents have three to five SMMAs, a plausible indicator of time spent on SMMAs, perhaps motivated by a "fear of missing out" (Hunt et al., 2018; Fumagalli et al., 2021). Numerous cross-sectional and a small number of longitudinal studies indicate that high levels of social media use are linked to depression and anxiety symptoms (Zink et al., 2019).

Based on the literature consulted, we can speculate that young Malaysian students are buffered from the potentially harmful effects of the lockdown measures, and this in spite of their heavy daily reliance on SMMAs. The following three factors may help explain this.

Living at Home with Family
One explanation is that most respondents live at home in families of four or more (see Table 1): they are, thus, less likely to go without meaningful face-to-face interaction and experience severe loneliness (Clark et al., 2018). A recent UK study suggests that individuals who live with others in a household have a reduced chance of loneliness compared to those who live alone (Groarke et al., 2020). If supportive, an individual's social network acts as a social buffer, improving their physical and mental well-being (Cohen & Hoberman, 1983; Leach et al., 2013). Sundarasen et al. (2020, p. 8) also emphasizes the shielding effect of staying with family and friends for Malaysian students, who comprise 71.8% of our sample (see Table 1).

Active SMMA Use
Unlike passive SMMA usage ("lurking"), active forms of SMMA usage are generally considered to improve psychological well-being (Seabrook et al., 2016; Verduyn et al., 2017). The majority of the young Malaysians in the survey qualify as heavy but active users, so this sample characteristic may well be another reason behind the findings. Note that many of the respondents are also students: prior research has shown that this social category tends to communicate actively rather than merely observe other SMMA users' content or monitor other people's lives (Burke et al., 2011; Escobar-Viera et al., 2018).

Social Integrative Needs
Clark et al.'s (2018) systematic review of the literature led them to conclude that "connection-promoting" SMU affects well-being positively. In our study, the second most frequent reason for using SMMA is social integrative gratification, promoting and making meaningful social connections. This may have partially offset the well-being risks associated with certain aspects of cognitive needs fulfilment – see below.

By the way, the rank order of SMMA gratifications among our respondents can be attributed to the high proportion of young (female) students within the sample. Romero-Hall et al. (2020, p. 247) found that undergraduate students use social media to meet cognitive and social integrative needs: "to facilitate research and online classes, sharing of data and information, engage in collaborative learning, increase networking between students". Nevertheless, the beneficial effect of using SMMAs for these purposes may be partially cancelled out by students' higher risk for loneliness during lockdown per se, as reported by Bu et al. (2020); this subject falls outside the scope of our study.

Considering what is known about mental health and loneliness risk factors to date, we can also account for the results by making the following three assumptions.

Limited Exposure to Online COVID-19 News
It was found that SMMAs are primarily used to meet cognitive needs like searching, accessing and sharing useful information. Seeing that frequent exposure to COVID-19 news is a risk factor (Xiong et al., 2020; Okabe-Miyamoto & Lyubomirsky, 2021), the low loneliness score suggests that cognitive needs fulfilment may not have included a great deal of news stories and updates about the pandemic as such. Respondents may have kept potentially distressing news exposure to minimal or manageable levels.

Absence of Pre-Existing Health Conditions
The results may also mean that most of the young Malaysian live-at-home respondents are neither chronically ill nor suffer from a mental disorder, which is another known risk factor (Xiong et al., 2020; Groarke et al., 2021; Okabe-Miyamoto & Lyubomirsky, 2021). Whether this is a likely assumption depends on Malaysia's population parameters. Malaysian loneliness research, however, seems to focus almost entirely on the elderly. Also, as was observed above, Malaysia's mental health scorecard looks at psychological disorders rather than non-clinical problems or certain components of mental health like loneliness. For 2015, the latest official figures available, the prevalence of mental disorders among adults (aged 16–59) is 29.2% – or almost one in three Malaysians (Ministry of Health Malaysia, 2017, p. 12) – but there is no breakdown in terms of early and middle adulthood.

Offline Social Interaction
Groarke et al. 's (2021) study on loneliness during the COVID-19 pandemic concludes that "the closeness and quality of relationships may be important" and that "face-to-face interactions are key" in reducing feelings of loneliness. We can assume that in addition to their within-household social interaction, our survey respondents may have frequent phone or video calls with people *outside the household* (Lange, 2021), and, more generally, have been "maintaining relationships with close ties through frequent, in-person communication" (Kovacs et al., 2021, p. 9). Interestingly, Okabe-Miyamoto and Lyubomirsky (2021, p. 136) cite recent evidence that phone calls, video calls, voice chats, voice notes and similar voice-based interactions enhance social connectedness compared to forms of communication that do not involve voice.

Research (e.g., Bu et al., 2020; Groarke et al., 2020) shows that the COVID-19 pandemic itself did not influence the various risks for loneliness; the factors are "near identical" before and during the crisis, such as gender (women) and age (young adults aged 18-30 years). Even so, there may be changes over time in how closely each of these risk factors correlates with loneliness; the somewhat surprising reason is that risk factors may also have a positive influence on how well or how quickly certain vulnerable categories of SMMA users adjust to the circumstances of a prolonged pandemic (e.g., Geirdal et al., 2021), a phenomenon known as psychological adjustment (e.g., Ellis et al., 2020).

CONCLUSION AND IMPLICATIONS
The present study has shown that also in Malaysia, mitigating the mental health impact of COVID-19 or addressing loneliness and social isolation among youngsters – and especially those who are also college or university students – will not depend on social media use alone. No evidence was found either for or against the existence of a direct and immediate link between loneliness and SMMA. A mono-causal explanation for loneliness is unlikely to

capture the complexity of mental health and psychological well-being. In other words, the study supports scholarship that sees SMMA not as a straightforward predictor but as a moderator, especially for the more exceptional cases of problematic social media use and social media addiction.

Since our findings are based on online purposive sampling, they require, as Barratt et al. (2015, p. 16) argue, additional studies that use "comparable probability samples and ethnographic fieldwork." Further research should focus more systematically on the unique affordances of specific social media and messaging services – as also suggested by Okabe-Miyamoto and Lyubomirsky (2021, p. 136) – and the continuum between active and passive SMMA users; it should also include more comprehensive profiling of SMMA users' personality traits (e.g., the Big Five), with additional scale-based survey sections on social interaction and interpersonal and social support. An under-explored avenue is also the interrelationship between online usage and gratifications and users' behaviour offline, a strand of research related to the online-offline integration perspective (Suler, 2000; Lin et al., 2018).

Somewhat unexpectedly, the survey findings suggest that even during the pandemic, the incidence of loneliness among live-at-home Malaysians aged 19 to 29 is low, with severe and persistent cases likely to be a minority. As in Kovacs et al.'s (2021) longitudinal study, we may conclude that the pandemic has so far had a heterogeneous effect on Malaysia's population, and secondly, that compared with in-person, face-to-face interaction, digital modalities of communication need not be less effective at staying connected, and thus, mitigating the risk of lockdown-induced loneliness. The implications are that for this subgroup of youngsters, not much can be expected from controlling or limiting social media use or messaging, especially in light of the predominantly social integrative uses both are put.

Although UGT and the social network approach to loneliness recognize the relevance of specific behaviours and motivations, they cannot fully explain or reconcile the conflicting evidence. Clark et al. (2018, p. 35) propose a simpler theory, focussing exclusively on whether or not SMMAs are meant to make meaningful interpersonal connections. However, intentions and results are not the same. Plausibly, the *value* that Malaysians attach to interpersonal connections, especially family ties, may act as a shield against loneliness rather than their quantity, quality or mode (online versus in-person). If so, and despite evidence-based reasons for curtailing social media use (e.g., Hunt et al., 2018), Malaysia's shared cultural values such as harmony, respecting elders and collectivism (Asma & Lim, 2001) would be a critical protective factor that helps young, active SMMA users cope with the challenges of COVID-19. On the importance of cultural variation in how SMMAs affect well-being, see Kross et al. (2021). It is a surprising insight and worth investigating further as a conjecture or new hypothesis.

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