FACEBOOK AND DEPRESSION IN COVID-19 PANDEMIC: THE ROLE OF TIME SPENT ON INFORMATION OVERLOAD AND DEPRESSIVE SYMPTOMS WITH TRAIT RUMINATION AS A MODERATOR

Miss Vidchuda Taechajinda

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เฟซบุ๊คและโรคซึมเศร้าในช่วงโควิด-19: ความสัมพันธ์ของปริมาณเวลาและอาการซึมเศร้า ผ่านภาวะข้อมูลท่วมท้น โดยมีลักษณะนิสัยครุ่นคิดเป็นตัวแปรควบคุม

น.ส.วิชชุดา เตชะจินดา

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
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By	Miss Vidchuda Taechajinda
Field of Study	Psychology
Thesis Advisor	Assistant Professor YOKFAN ISARANON, Ph.D.

Accepted by the FACULTY OF PSYCHOLOGY, Chulalongkorn University in Partial Fulfillment of the Requirement for the Master of Arts

..... Dean of the FACULTY OF PSYCHOLOGY
(Assistant Professor NATTASUDA TAEPHANT, Ph.D.)

THESIS COMMITTEE

..... Chairman
(Assistant Professor Watcharaporn Boonyasiriwat, Ph.D.)

..... Thesis Advisor
(Assistant Professor YOKFAN ISARANON, Ph.D.)

..... Examiner
(Assistant Professor PRAPIMPA JARUNRATANAKUL, Ph.D.)

..... External Examiner
(Associate Professor Sittipong Wattananonsakul, Ph.D.)

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ปัจจุบันการแพร่กระจายของเชื้อไวรัสโควิด-19 นำมาสู่ความกังวลในเรื่องสุขภาพและความเป็นอยู่ของคนในสังคม โดยเฉพาะอย่างยิ่งเมื่อมีการบังคับใช้มาตรการควบคุมโรค เช่นการเว้นระยะห่างทางสังคม ที่ทำให้การติดต่อสื่อสารและรับส่งข้อมูลมีความยากลำบากมากยิ่งขึ้น ส่งผลให้สื่อสังคมออนไลน์ เช่นเฟซบุ๊ค กลายมาเป็นแหล่งสืบค้นข้อมูลที่สำคัญของประชากร ซึ่งอาจนำมาสู่การได้รับข้อมูลที่มากจนเกินไป และสร้างเป็นแนวโน้มด้านลบต่อสุขภาพจิต รวมถึงอาการซึมเศร้าของประชากรในวงกว้าง การวิจัยนี้เป็นการวิจัยเชิงพรรณนาแบบตัดขวาง (Cross-sectional descriptive study) มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์ของปริมาณเวลาการใช้เฟซบุ๊คเพื่อสืบค้นและรับข้อมูลเกี่ยวกับโควิด-19 และอาการซึมเศร้า ทั้งยัง เพื่อศึกษาบทบาทการเป็นตัวแปรส่งผ่านของภาวะข้อมูลท่วมท้น และบทบาทการเป็นตัวแปรกำกับของลักษณะนิสัยครุ่นคิดในความสัมพันธ์นี้ โดยมีผู้เข้าร่วมการวิจัยจำนวน 140 คน ซึ่งเป็นบุคคลที่ไม่เคยได้รับการวินิจฉัยว่าเป็นผู้ป่วยโรคซึมเศร้า มีอายุอยู่ในช่วง 18 ถึง 34 ปี และอาศัยอยู่ในกรุงเทพมหานครในช่วงเวลา 2 ปีที่ผ่านมา ผู้เข้าร่วมการวิจัยทำการตอบแบบสอบถามเกี่ยวกับปริมาณเวลาการใช้เฟซบุ๊คเพื่อสืบค้นและรับข้อมูลเกี่ยวกับโควิด-19 ภาวะข้อมูลท่วมท้น ลักษณะนิสัยครุ่นคิด และอาการซึมเศร้า การวิเคราะห์ทางสถิติพบว่า ปริมาณเวลาการใช้เฟซบุ๊คเพื่อสืบค้นข้อมูลเกี่ยวกับโควิด-19 ส่งผลต่อการเพิ่มขึ้นของอาการซึมเศร้าอย่างมีนัยสำคัญทางสถิติ อีกทั้งผู้เข้าร่วมวิจัยที่มีระดับภาวะข้อมูลท่วมท้นที่สูง จะส่งผลให้มีอาการซึมเศร้าที่สูงอย่างมีนัยสำคัญทางสถิติเช่นกัน ทั้งนี้ ในงานวิจัยไม่พบอิทธิพลส่งผ่านของภาวะข้อมูลท่วมท้นในความสัมพันธ์ระหว่างปริมาณเวลาการใช้เฟซบุ๊คและอาการซึมเศร้า รวมทั้ง ไม่พบอิทธิพลกำกับของลักษณะนิสัยครุ่นคิดในความสัมพันธ์ระหว่างภาวะข้อมูลท่วมท้นและอาการซึมเศร้า รวมถึงความสัมพันธ์ของปริมาณเวลาการใช้เฟซบุ๊คและอาการซึมเศร้าผ่านภาวะข้อมูลท่วมท้นสำหรับการประยุกต์เพื่อนำไปใช้ประโยชน์ ผู้วิจัยคาดหวังว่าผลการวิจัยจะสร้างเป็นแนวคิดและความเข้าใจที่เพิ่มมากขึ้น เกี่ยวกับผลเสียที่จะตามมาจากการใช้สื่อสังคมออนไลน์ในช่วงการแพร่ระบาดของเชื้อไวรัสโควิด-19 อีกทั้งยังอาจนำมาสู่การพัฒนามาตรการและแนวทางป้องกันและดูแลสุขภาพจิตของประชากรในประเทศที่อาจตามมาในอนาคต

สาขาวิชา จิตวิทยา ลายมือชื่อนิสิต .....
ปีการศึกษา 2564 ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

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The current COVID-19 pandemic has led to concerns for health and well-being, especially when the quarantine strategy such as social isolation has been implemented. Since social media has become an essential source of information, it might overwhelm its users by providing too much information which could yield many negative psychological outcomes, including depressive symptoms. The proposed research is designed to investigate the role of time spent on Facebook for searching and receiving information about COVID-19, as well as trait rumination on information overload and depressive symptoms. Non-clinical 140 active Facebook users aged between 18 to 34 who live in Bangkok are recruited. Participants were asked to complete a series of questionnaires measuring time spent on Facebook, perceived information overload, RRS-SF, and PHQ-9. Descriptive statistics, Mediation, and Moderated Mediation with Process in SPSS were used to analyze the relationships among variables. Statistical analyses revealed that higher levels of individuals passively spending time on Facebook for receiving and searching for COVID-19 information results in higher levels of depressive symptoms. Moreover, the relation between perceived information overload and depressive symptoms did yield a significant result, which indicated that the more individuals felt that they received too much information, the higher levels of depressive symptoms they have. However, the mediation analysis presented that perceived information overload did not mediate the relation between time spent on Facebook and depressive symptoms. Also, the trait rumination did not moderate either the effect of the perceived information overload on depressive symptoms or the indirect effect of the time spent on Facebook on depressive symptoms through the perceived information overload. For the implications and applications of this present study, it is expected that this research will provide a wider understanding of the negative influences of social media use during the COVID-19 pandemic. Findings from this research may also contribute to social policy in generating initial preventive programs or guidelines for the normal population.

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Vidchuda Taechajinda

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Chapter 1
Introduction

Over the last 2 years, the COVID-19 pandemic has become the most serious international health problem all over the world. Apart from the disease itself, the general population is also facing psychological strain profoundly by the obstruction of interpersonal communication (Bendau et al., 2021) based on the quarantine strategy; e.g. social distancing, to prevent the spread of the infection. Moreover, the demand of searching for information in relation to COVID-19 seems to be continually high.

Previous research has found that the influence of COVID-related media exposure leads to stress-related mental health symptoms such as depression and anxiety (Gao et al., 2020; Veer et al., 2020). More importantly, results from a meta-analysis by Bueno-Notivol et al. (2021) also indicated that during the confinement and COVID-19 outbreak, the number of depressed individuals in the general population is rising to 25% and seem to have increased continuously. In Thailand, the report from the 20th Annual International Mental Health Conference on July 2021 stated that the COVID-19 pandemic affected individuals' mental health severely by stress, worries, hopelessness, and fatigue, which could lead to the development of depressive symptoms, especially among those residing in higher risk areas.

This is consistent with previous research which suggests that uncontrollable and uncertain events, such as COVID-19 can create fear and anxiety which can be overwhelming, make people feel helpless, have negative emotions towards the situations, and reduce the motivation to take any action yielding a sense of depressed mood (Seligman, 1972). In particular, Lei et al. (2020) found that depressed individuals are less likely to seek help either for physical or mental symptoms, which

can be seen as a barrier the interventions and medical supports during pandemics (Wang et al., 2021).

Since the restriction of face-to-face interaction has been adopted, social media has become either supplementation or substitution for information from traditional sources during the COVID-19 pandemic (Mertens et al., 2020). Social media platforms such as Facebook, Twitter, Instagram have now become the crucial means for individuals to receive and share their opinions, experiences, worries, and fears towards the pandemic situation. On one hand, social media gives an update on health information related to COVID, which seems to decrease depression (Nguyen et al., 2020; Wang et al., 2021). On the other hand, independently of actual risk, it can also create an immediate stream of fear about the rapid spread of disease (Ofri, 2009), the unemployment rate, (Kazmi et al., 2020), lack of social support (Ni et al., 2020), and lower social status (Nguyen et al., 2020), resulting in higher rates of depression. Those who use social media as a primary source of COVID-19 information are likely to be depressed (Bendau et al., 2021). Additionally, the research of Zhao and Zhou (2020) indicated that the usage of social media, but not traditional media, related to COVID-19 was positively associated with negative affect and depression, suggesting that time spent on social media could be a critical factor for mental health issues.

It is important to note that the more individuals experience depressed moods, the more they engage in using virtual online to escape from their thoughts (Feinstein et al., 2012). Moreover, passive exposure to the contexts in social media posts has been shown to increase the negative emotions of the receivers (Coviello et al., 2014; Kramer et al., 2014). In details, individuals who spent more than 2 hours daily on social media reading news about COVID-19 or were exposed to social media more

than usual were likely to have a higher level of depression and anxiety (Ni et al., 2020; Ustun, 2021). These findings suggest that individuals can be triggered by excessive or inaccurate information via using social media and develop depressive symptoms due to their intensive use of social media (Ustun, 2021).

Social media can also transmit massive information in various forms (e.g. text, picture, video), providing people the ability to be informed and connected with other people who have been exposed to the disease directly. Still, the spreading of rumors, conspiracies, or misinformation can worsen an individual's personal interpretations, which can lead to the negative psychological outcomes (Wang et al., 2019). Given the increasing information production and accessibility on social media, it is highly likely that individuals might experience 'information overload' (Klerings et al., 2015).

Information overload can be seen as an important factors that can worsen mental health during the pandemic. Together with the social media, such as Facebook and Twitter, the ability to access to the latest information in the matter of second may overburden people with too much information (Fiorillo & Gorwood, 2020). Garfin et al. (2020) stated that the excessive use of social media to gather information related to COVID-19 might increases stress and create long-term psychological agony. In addition, the individuals who received information via social media significantly perceived the higher level of information overload, resulting in psychological stress, negative emotion (Lee et al., 2016), and depressive symptoms (Matthes et al., 2020).

Extensively and passively receiving negative information from social networking sites (SNSs) could also increase levels of depressive symptoms among those with trait rumination. Specifically, the association between acquiring negative information on SNSs and depression was found to be mediated by rumination

(Locatelli et al., 2012). Rumination is one of the response styles which links the development or maintenance of the depression and stressful life events (Michl et al., 2013). SNS environment provides an opportunity for an individual to ruminate on bad situation and events that happened or about to happen around us freely. However, there are individual differences in the response to depressive mood (Nolen-Hoeksema, 1991). That is, for some individuals, cognitive response styles (i.e. rumination) may stress the negative interactions between social media use and depressive symptoms more severely (Seabrook et al., 2016).

Despite the positive association between the consequences of social media use and depressive symptoms (Shensa et al., 2017), it remains unclear how receiving COVID-19 information through social media, especially Facebook, decreases mental well-being and increases risk for affective disorders. Moreover, little is known whether perceived information overload and trait rumination could increase depressive symptoms via Facebook use. From the compound of all the above findings, the present study is the cross-sectional descriptive study attempts to investigate the influence of time spent on Facebook searching and receiving COVID-19 related information, perceived information overload about COVID-19 on Facebook, and users' trait rumination on depressive symptoms in non-clinical depression populations.

Literature review

Depression

Depression, otherwise known as major depressive disorder, is the main type of mood disorder, characterized by high negative and low positive moods (Kazdin et al.,

2000). To be diagnosed with depression, individuals must be experiencing five or more symptoms, based on the diagnostic criteria from DSM-5 (APA, 2013), during the 2-week period and at least one of the symptoms that they needed to experience nearly every day should be either depressed mood or loss of interest or pleasure in almost all activities. The other wide range of depressive symptoms are from significant loss of weight or gain too much, inability to concentrate, lack of energy, having insomnia or excessive sleeping, decrease the ability of thinking and a reduction of physical movement, feelings of unworthy, or extravagant guilt, and repeated thoughts of suicide or death. However, the present research mainly focuses on the depressive symptoms which are the onset characteristics to be categorized as clinical depression.

According to the World Health Organization (WHO), depression is now a common illness worldwide, with more than 264 million people affected. Depression is correlated with a consolidation of psychological, biological, and social elements (World Health Organization, 2020). Unlike short-lived emotional responses to everyday life or usual mood fluctuations, depression can be long-lasting and if the symptoms have manifested intensively, depression may become a serious health condition, resulting in poor performance at work, school, or in a family. In severe intensity, depression can lead to suicide or injuring others. In Thailand, according to the Department of Mental Health (DMH), under Ministry of Public Health, in 2019, there are 1,118,083 reported depressed patients – these are the ones that sought and received professional help.

There are several theories discussing depression, e.g. Beck's cognitive theory of depression, Hopelessness theory, and The Response Style Theory. Regarding

Beck's cognitive theory of depression (Beck, 1995), established on the resemble of automatic negative thoughts, there is an individual difference in continuously having negative thoughts about themselves, the world, and the future. These negative thoughts are likely to develop into negative self-schema which lead to logical errors in thinking and create a depression state for these individuals. Such negative self-schemas have an important effect on the information processing function ushering an individual's attention, interpretation, and memories for personal negative experiences (Clark et al., 1999). Confronting negative mood states and stressful life events can activate the schema that leads to specific automatic thoughts and cognition (Beck, 1995). Having negative cognitions can, thus, further maintain and intensify negative effects which enhance depressive symptoms (Watkins, 2008).

On the other hand, the hopelessness theory of depression proposed by Abramson et al. (1989) focuses on using attribution theory to explain the reason of how some individuals become depressed when confronting an unmanageable stressor whereas others do not. Based on this perspective, individuals usually form causal conclusion along three different elements, which are internal/external, stable/unstable, and global/specific, in response to a negative life event. Those who feature a negative event to internal, stable, and global causes are likely to develop depression. For example, depression is highly likely to occur among those who, whenever have an argument with an acquaintance, would perceive this event as a result of their deficient interpersonal ability (internal). Moreover, they think that this similar event would continue to happen (stable), and negatively affect their other social interactions (global). In general, the theory suggests that repeated exposure to unmanageable, aversive environmental incitements, and these casual attribution lead to the

understanding that the situation is inevitable and increases a feelings of hopelessness. This hopelessness, in turn, yields depression.

In addition, the Response Style Theory by Nolen-Hoeksema (1991) stated that rumination is a trait-like characteristic of a person who are susceptible to prolonged the mood affect episodes (Joormann, 2005), which can lengthen the duration and also predict the onset of depression. It is the response mechanism to distress that involves continuously and passively focusing on symptoms, the consequences of these distress symptoms, and also the possible causes. Individuals who prone to ruminate usually focus solely on the problem and their feelings about these symptoms without actively apply any problem-solving behavior (Nolen-Hoeksema et al., 2008). It can be seen that there are individual differences in the level of rumination that affect the belief in the negative outcomes in the future, and evaluate themselves and their current situation in more negative and hopeless ways (Lyubomirsky et al., 1998). All in all, trait rumination and interpersonal stress can be seen as another key contribution to the depressive symptoms over time (Flynn et al., 2010; Mitra & Rangaswamy, 2019).

Rumination

From the first idea of rumination by Nolen-Hoeksema and colleagues (2008), rumination was first defined as a factor that prolonged the duration of the depression. However, later research suggests that rumination is the key variable that consistently predicts the onset of depression. In details, results from an experiment by Nolen-Hoeksema (2000) found that among individuals who were not clinically having major depressive symptoms, rumination scores at first evaluation predicted a development of major depressive symptoms over the next year. Apart from the establishment of

depression, rumination is also leading to binge consuming, anxiety, or self-harm (Nolen-Hoeksema et al., 2008).

Pasyugina et al. (2015) showed that the difference level of rumination leads to a development of depressive symptoms in individuals, and even there is some changes in individual's level of depression, individuals still have a stable tendency to ruminate (Bagby et al., 2004). In addition, the association between repetitive thinking about negative content and negative affects is stronger than that between repetitive thinking on positive content and positive affects (Nolen-Hoeksema et al., 2008). This shows that having a high level of rumination can bring about the concentration on negative content and worsen the negative effect.

Rumination and Response Style theory

In this paper, the response style of depression is the main theory to explain rumination that is related to depression. Thus, rumination in this study is a trait-like response style that depends on the individual differences in their negative mood states reaction (Nolen-Hoeksema, 1991). The important key characteristic of a ruminative response style is the individual's attention to their negative emotional state and inhibit the abilities to distract themselves from their moods (Nolen-Hoeksema, 1991), which leads to the two-factor model of rumination.

The two-factor model of rumination consists of 1) brooding; passive and self-reflective thoughts about a desired goal that against the current situation, and 2) reflective pondering; a purposeful examination attempting to find a problem-solving for the depressed mood (Rewston et al., 2007). From two types of rumination, brooding was associated with impaired inhibition and shifting attention impairments (Koster et al., 2011), resulting in depression rather than pondering (Sütterlin et al.,

2012). Moreover, brooding was correlated with negative attentional and memory biases, even after controlling for depressive symptoms. It was significantly associated with a higher level of depressive symptoms, that did not depend on age or sex. On the other hand, pondering was associated with only memory biases. Yet, such connection was depended on age and sex, and disappeared when controlling the effect of depressive symptoms (Nolen-Hoeksema et al., 2008).

In summary, Nolen-Hoeksema (1991) has proposed that depressive rumination is the inclination to repetitively and passively concentrate on the experience, causes, and consequences of the negative moods. It is an important risk factor for emotional instability and psychological disorder that leads to depressive symptoms. Individuals who have repetitive thinking styles tend to use an emotion-focused coping strategy (e.g. using emotional reactions in coping with the situation at hand; Nolen-Hoeksema et al., 2008). Moreover, they are likely to focus on emotional content in the situation which can intensify their negative mood.

It is notable that having a high level of negative mood for a long period of time can easily lead to mood disorder and create the symptoms of depression. Morrow (1990) found that focusing on current emotional state helped maintain depressed mood to be presented longer than focusing on personal qualities, goals, and experiences. Moreover, the repetitive thinking response style (i.e. rumination) was found to predict higher levels of unhappy and dissatisfied over time among nonclinical individuals, even after controlling for depressive symptoms level (Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema et al., 1994). Additionally, findings from Flynn et al. (2010) also revealed that by having repetitive thinking, dwelling in the negative cognitions, and emotions might lead to a feeling of hopelessness,

worthlessness, and cause individuals to isolate themselves from any interpersonal relationships which worsen social support they needed.

Rumination and Problem-solving strategy

Individuals who are susceptible to rumination usually believe that they are trying to acknowledge their mood and symptoms clearer or trying to find a solution to their problem by thinking about the situation continuously. However, ruminative thinking is likely to expand negative moods and thoughts by solely focusing on the current negative mood. This reduced the tendency to produce the effective problem-solving due to the feeling of overwhelming and unsolvable (Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky et al., 1999). That is, when individuals have a negative mood, they tend to ruminate and remember more negative memories, be pessimistic about their future, and negatively explicate their current situation more (Nolen-Hoeksema, 2000), leading to depressive symptoms over time. Such responses would disrupt both finding effective problem and initiating of positive behaviors (Nolen-Hoeksema, 1991), yielding a lower quality of solutions to the problem-solving strategies.

Additionally, when individuals focus on their depressed emotional states, it is likely that they are focusing on the negative perspective of their moods which can bias all information into negative ways (Nolen-Hoeksema, 1991). The experiment by Nolen-Hoeksema (1991) that put participants in two conditions; distracting and ruminative conditions, showed that participants in the first conditions showed a higher level of decreases in depressive effect than the other condition. Also, when investigating among depressed subjects, the results indicated that those who participated in the ruminative task were significantly more depressed than those who

were in the distracting task. It suggests that ruminative focusing can extend an existing depressed mood.

Rumination and Stressful event

Even though rumination refers to a stable trait-like response style, it can also be fluctuated by the presence or absence of certain triggers (i.e. stressful events; Smith & Alloy, 2009). Rumination that occurs after individual experiencing stress is called stress-reactive rumination (SRR; Robinson & Alloy, 2003). After experience SRR, individuals are expected to produce negative perspectives about the situations that they engaged in and ruminate about the causes, consequences, and future action. However, SRR did not independently affect depressive symptoms, there was also an interaction between SRR and the number of stressors that lead to the higher level of depression (Connolly & Alloy, 2017).

Connolly and Alloy (2017) indicated that the change in magnitude of stressors can affect the variation of rumination which can indeed be a factor for depression. From Vanderhasselt et al. (2016), when participants experienced a stressful event, rumination level was higher and predicted depressive symptoms in 3- and 15-months follow-up. This suggests that that rumination, together with life stress, can increases depressive symptoms over time (Connolly & Alloy, 2017). Even in the control groups that have no history of mental illness, a higher level of rumination after stress still predicts deficient emotional, behavioral, and symptom outcomes (Ruscio et al., 2015).

Negative life events can also produce discrepancies between goals and individual's current state which leads to passively ruminate about how to decrease these conflicts (Martin & Tesser, 1996). From the Goal Progress Theory (Martin & Tesser, 1996), rumination occurs when an individual realizes that one has not

attained, or not be able to progress successfully towards a wanted goal. Goal-oriented rumination can be both helpful if the unresolved goal is progressing towards a solution, and can be unhelpful if it only increases the discrepancy between goal and solution (Watkins, 2008). Therefore, rumination is expected to continue until the wanted goal is either accomplished or relinquished, meaning that rumination may lead to depression if an individual continues to perceive failure to progress towards goals.

In addition, individual differences in the ability to manage negative affect and the cognitive control functions are related to a rumination which can prolong negative effects upon facing stressful situations (Davis & Nolen-Hoeksema, 2000; Joormann & Gotlib, 2007). Lyubomirsky and Nolen-Hoeksema (1993) proclaimed that individuals who had been instructed to ruminate showed less willingness to participate in pleasant activities which could intensify or prolong the effect of stress by inhibiting pleasant action. It also showed that, in stressful events, rumination was associated with avoidance behavior, inactivity, and social withdrawal. Thus, rumination, together with stressful life events, could weaken individuals' willingness to solve their problems or participate in other more positive coping activities, leading to depressive symptoms (Michl et al., 2013).

Bias information processing & Attention control deficit

Rumination is related to biases in information processing. Individuals with rumination are more likely to remember and focus on negative rather than positive information (Nolen-Hoeksema et al., 2008). An experiment from Nolen-Hoeksema et al. (2008) showed that individuals who have a high score on rumination exhibited a higher deficits in inhibiting emotional information than low-scored individuals. In addition, when comparing ruminators with non-ruminators, results showed that

ruminators found it difficult to inhibit and shift their attention from one task to another, suggesting that higher levels of rumination are negatively correlated with attentional control (Koster et al., 2011). In details, attentional control refers to the ability to selectively focus on task-relevant information and to hinder distraction by task-irrelevant information. The absence of attention control and being trap in the vicious cycle of negative thoughts can sustain the self-referring negative information, reduce the quality of thinking, and produce less constructive problem-solving, resulting in having ruminative thoughts and depression over time (Koster et al., 2011; Nolen-Hoeksema et al., 2008).

It is important to note that the deficits in the inhibition of negative information can yield difficulties for individuals to adopt positive distracters for managing their negative mood (Joormann, 2005). In general, when individuals confront with problems, there is a tendency that they would be self-criticized about how the problem occurs, which in turn elicits a negative mood state. However, to successfully find solutions to their problems, they need to distract themselves from negative thoughts and allow themselves to reappraise the situation, as well as focus on generating problem-solving tasks (Koster et al., 2011). Prior research has also shown that the difficulties in disengage attention control about the negative thoughts could lead to persistent of rumination (Koster et al., 2011). For example, De Lissnyder et al. (2010) found that after controlling for depression scores, the difficulties in constraining negative words from working memory was associated with depressive rumination. Thus, the ability to eliminate emotional information from working memory is important to reduce rumination (Koster et al., 2011).

It is also worth noting that the difference between depressed and non-depressed individuals depends on the degree to which they are able to distract themselves from the mood, not the frequency of being in a sad mood they experience (Teasdale, 1983). Distressed individuals understand that having positive distracters can lift up their mood, but they find it difficult to do so (Nolen-Hoeksema et al., 2008). This is in line with findings from Koster et al. (2011) which showed that both rumination and attention disengagement deficits could maintain dysphoric emotions within individuals and worsen the mood. Moreover, Yaroslavsky et al. (2019) indicated that slow attentional disengagement from sad faces predicted greater ruminative tendencies which predicted elevated depression symptoms.

Such assumption is also consistent with previous findings from neuroimaging studies. For example, prior research has found that there are differences between ruminators and non-ruminators in the brain areas when performing tasks that are emotional, demand self-referential thought, or involve inhibition of emotion (Nolen-Hoeksema et al., 2008). Rumination is reported to be associated with increased amygdala activity during the processing of emotional stimuli (Ray et al., 2005). Also, Default-mode-network (DMN), a set of brain regions that decreased neural activity during goal-oriented tasks (Shulman et al., 1997), has been linked to several forms of mental disorder, including depression (Sheline et al., 2009). This suggests that the inflexibility of DMN might be involved with depression (Provenzano et al., 2021). These findings are consistent with the initial definition of depression that referred to the difficulties in flexibly changing concentration away from emotional content (Linville, 1996).

From all the compounds above, it can be concluded that rumination is characterized by having negative self-focused thoughts, and ruminating in a mood state (Joormann, 2005). In addition, it is highly likely that individuals who ruminate may utilize social media, by spending an extreme amount of time to express or maintain their negative-thought cycle, yielding higher level of depressive symptoms (Mitra & Rangaswamy, 2019).

Social media

The increasing use of social media is strongly known to increase the likelihood of mental health issues, especially amongst the millennial generation (Nisar et al., 2019). According to Statista, a market research company, the number of active social media users around the world reached 4.2 billion in January 2021. Also, the average daily social media usage of internet users worldwide amounted to 145 minutes per day in 2020 which is up from 142 minutes in the previous year. Facebook, the first social network to surpass one billion registered accounts with more than 2.8 billion monthly active users, is one of the biggest social networks worldwide. In 2020, approximately 50.75 million people have been using Facebook in Thailand and the highest number of Facebook users is individuals aged between 18 and 34 years old (Statista Research Department, 2021).

According to the Differential Susceptibility to Media Effects Model (DSMM; Valkenburg & Peter, 2013), media usage can influence users' emotional, cognitive, and behavioral outcomes. However, such effects can be different in each individual depending on the direction and strength of the media exposure. Kross et al. (2013) reported that the more SNS users experienced a negative effect, their life satisfaction

became lessened dramatically. Moreover, time spent on social media was found to be positively correlated with greater symptoms of depression (Thorisdottir et al., 2019). Such relationship was also found to be stronger among women, as well as, those with passive use (Thorisdottir et al., 2019).

Active social media uses include chatting, sharing photos, updating status with others, or writing other personal information that others can comment or click likes. These active activities can reflect individual's self-concept, words, or thoughts which lead to engagement with others. Active users usually share life experiences by creating contents and responding to other users frequently. This might be seen as an active coping solution once they encounter with problems in life. This is because the active uses of SNSs usually increase individual social interaction, enhance self-esteem (Vogel et al., 2014), and life satisfaction (Toma & Hancock, 2013).

On the other hand, passive uses involve consuming information by browsing, scrolling, or looking at content from others which could be unrelated to the person's self-concept. Moreover, passive users tend to observe and maintain low engagement with others, which reduce their chance to find social support for their problem solving. As a result, they might find it easier to ruminate on the negative contents. Research has shown that passive uses of SNSs increase negative mood and further decrease well-being (Verduyn et al., 2015), which later predict depression (Tandoc et al., 2015). Therefore, rumination seems to be another important mechanism underlying why passive users surrounding with negative information are more likely to become depressed (Davila et al., 2012; Locatelli et al., 2012).

Despite time duration and frequency (Davila et al., 2012), information overload from SNS use could also lead to rumination and depressive symptoms

(Farooq et al., 2020). Having too much information can easily hinder individual's ability to develop an unbiased assessment of the information and situation, which might lead to higher levels of fear and stress (Liu et al., 2021). Moreover, information overload could affect individual's psychological ill-being; the experience of negative moods and explicit psychological disorder, such as emotional exhaustion (Stebbings et al., 2012; Swar et al., 2017). As individuals with rumination have high tendency to have negative self-referential processing and difficulties in self-focused disengagement (Nolen-Hoeksema et al., 2008), they might end up having negative perceptions of their social environment and decreasing in seeking social support (Sheeber et al., 1997), which in turn might yield depressive symptoms in later time (Flynn et al., 2010).

In the midst of COVID-19, there are several factors that could contribute individual's cognitive overload. This include acquiring a large proportion of new knowledge and information on social media (Laato et al., 2020) with an urge to adapt the new knowledge faster due in order to deal with the rapid change of the situations. Moreover, information overload has been found to be associated with cyberchondria; online health searches that increase the anxiety and distress (Starcevic & Berle, 2013), through the repeatedly seeking for health information (Norr et al., 2015). Recent study has also shown that 82% of participants frequently expose to COVID-19 information via social media, resulting in higher levels of depression and anxiety (Gao et al., 2020). Therefore, it can be seen that social networks (i.e. the Facebook newsfeed) could overwhelm individuals by the massive stream of information, range from friends' updates, liked pages, shared groups, and information or news selected by the

algorithm (Matthes et al., 2020) that could easily lead to the feeling of ‘information overload’ (Klerings et al., 2015).

Information overload, Rumination, and Depressive symptoms

In the recent world, the deleterious overuse of technology can be problematic and may lead to negative consequences (Caplan, 2010; Yellowlees & Marks, 2007). Technology overload lowers psychological well-being by inducing negative emotion, rather than increasing the expected enjoyment. In particular, the uncontrolled usage of technology was found to increase stress and decrease psychological well-being, resulting in higher levels of depression (Sagioglou & Greitemeyer, 2014). Soroya et al. (2021) found that, among all media exposure, only social media was associated with information overload.

Given the diversity of media platforms in the digital era, individuals are bombarding with a large proportion of both relevant and irrelevant information. Thus, managing and evaluating such information requires mental resources. Yet, not all individuals could process information on online platforms including social networking sites effectively. Moreover, the efficacy to utilize available information is also varies among users (Bawden et al., 1999). According to this, the inability to process and filter information seems to be a key factor that could contribute to mental health issues (Klerings et al., 2015).

Based on the Information Processing Theory (IPT; Atkinson & Shiffrin, 1968; Miller, 1956), there is three-stage of the information process. After human brain receives information from all sources, it then immediately transmits such information to sensory memory (SM). Only relevant information will be further proceeded to the

working or short-term memory (STM). Then, individuals will categorize, compare, or combine the pieces of received information for interpretation and identification. Information, with repetition, will then be restored in long-term memory (LTM). Yet, these processes require individual's cognition, training, and proficiency (Atkinson & Shiffrin, 1968).

Information overload usually occurs when the ability to select and process the information exceeds the actual amount of information presented (Swar et al., 2017). It can also be seen as a discrepancy between the neural capacity of the individual and the level of individual's extension knowledge (Hanka & Fuka, 2000), which can diminish the quality of decision and performance of individual towards each situation (Eppler & Mengis, 2004). Information overload can affect an individual's self-efficacy by reducing the accurate understanding of the situation due to the over-received information (Farooq et al., 2020). Yet, some individuals have deficits in inhibitory processes, another part of selective attention processes (Joormann, 2005).

In general, selective attention involves two processes; 1) the activation of selected relevant information, and 2) the active inhibition of non-selected irrelevant information (Hasher & Zacks, 1988). The second process allows individuals to stop processing irrelevant information to access into the working memory, which can dampen attention from relevant information toward an existing goal (Joormann, 2005). Hasher and Zacks (1988) proposed that the inhibitory deficits can lead to too much irrelevant information in working memory, resulting in slower the retrieval of relevant information. Moreover, the irrelevant information in working memory can distract the individual to retrieve the information accurately which can worsen their cognition and emotional consequences.

Previous research on social media showed that information overload was higher among those who used social media as the main source of information (Laato et al., 2020). Given social media contains numerous information among users, most people may find difficulties in finding the most desirable information with their limited capacity (Ji et al., 2014; Jiang & Beaudoin, 2016). In addition, social media can facilitate the spread of fake news and misinformation by reinforcing confirmation bias, which in turn can create more fear and distress within individuals (Laato et al., 2020). Prior studies found that information overload could create a feeling of losing control and stress that affected individuals' information processing capacity (Eppler & Mengis, 2004), which caused more psychological stress (Eppler, 2015), negative moods and emotions (Zhang et al., 2020), and depressive symptoms (Swar et al., 2017), and eventually decreased individual's well-being over time (Matthes et al., 2020).

This is in line with the idea proposed by several theorists that the effects of negative mood on information processing can maintained the depressed mood in individuals (Blaney, 1986; Bower, 1981; Ingram, 1984; Lewinsohn et al., 1985; Teasdale, 1983). That is, if negative representations and cognitive schemas are activated when an individual is depressed, there is a high chance that they would turn their attention inwards on those negative self-thoughts and judge their situation as aversive and uncontrollable, leading to the vicious cycle of negative information processing. In contrast, if negative cognitive schemas are not activated, individuals are likely to cope with depressive symptoms more actively (Nolen-Hoeksema, 1991).

It is important to note that depressed individuals exhibit a systematic bias in their information processing, in which they selectively choose a negative stimulus

from their situation, even neutral and ambiguous stimuli in a schema-congruent way (Joormann, 2005). Even though individuals do not automatically receive negative information from the situation, when such information has entered their attention, they tend to disengage that from their attention (Joormann, 2005). In conclusion, social media platforms which contain excessive information and enable users to ruminate on negative information freely, together with individual differences in the ability to distract from negative information, might play important roles in maintaining a depressed mood (Nolen-Hoeksema, 1991; Nolen-Hoeksema et al., 1993).

Purposes of the Study

Even though a large number of studies have found negative effects of information on social media on psychological well-being (e.g., depression), little is known whether and how information bombardment on social media, especially Facebook, could be another mechanism underlying such relationship. The present study, thus, aims to investigate whether individuals' time spent on Facebook searching and receiving COVID-19 related information would influence perceived information overload about COVID-19 on Facebook, which in turn resulting in higher levels of depressive symptoms. Moreover, during COVID-19 pandemic with extensive and negative information, trait rumination might strengthen such association and worsen individual's mental health as outlined in Figure 1.

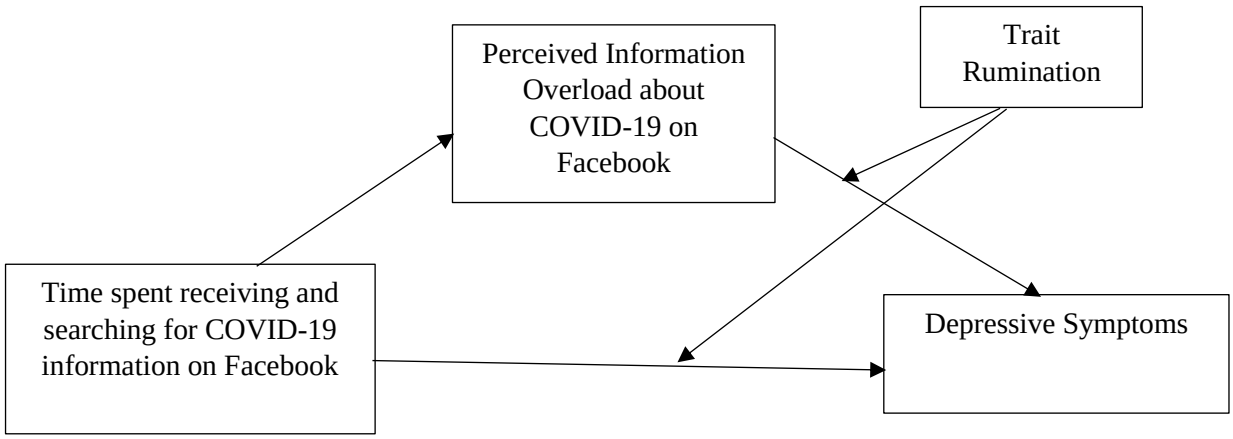

Figure 1. Research Model

The research model is proposed based on relevant literature. First, research on social media has found a positive relationship between social media use and depressive symptoms. For example, Steers et al. (2014) found that time on Facebook was positively associated with depressive symptoms for both genders. However, the frequency of login into Facebook had no significant relation with depressive symptoms. In addition, the positive relationship between time spent on social media and depressive symptoms was stronger among those with passive use (Thorisdottir et al., 2019). *Therefore, it is expected that the more time individuals passively spend on Facebook searching and receiving information about COVID-19, the more likely they will encounter depressive symptoms.*

In addition to the relationship with depressive symptoms, previous study also showed that social media uses had a positive association with perceived information overload (Farooq et al., 2021). In details, when individuals are exposed to social media, they are likely to experience information overload which in turn yield information anxiety (Soroya et al., 2021). Moreover, consistent findings also showed that perceived information overload had a positive relationship and predicted higher

levels of depressive symptoms at a later time (Matthes et al., 2020; Swar et al., 2017). Regarding the above findings, the current study thus proposes that *individuals who are faced with information overload from using social media to search and receive COVID-19 information will be suffering from depressive symptoms more severely.*

Lastly, it is worth noting that trait rumination might play a role on depressive symptoms after searching information on social media. Davila et al. (2012) reported that higher levels of depressive rumination was associated with greater depressive symptoms. Moreover, findings from Locatelli et al. (2012) and Mitra and Rangaswamy (2019) also showed that rumination positively predicted depression. Given depression is marked by difficulties in changing attention away from emotional information (Yaroslavsky et al., 2019), it might be higher among those bombarded with too much information, especially those with trait rumination. This is mainly because information overload could worsen information processing and increase deficits in an individual's inhibitory processes. In addition, those with trait rumination fundamentally have difficulties in shifting their attention away from negative thoughts. As a result, *it is expected that the individuals with higher levels of rumination will have a higher level of depressive symptoms from using Facebook and perceived information overload than the ones with lower levels of rumination.*

Research Hypotheses

Hypothesis 1: Perceived information overload about COVID-19 information on Facebook would mediate the relationship between time spent on Facebook searching and receiving COVID-19 related information and depressive symptoms.

1.1 Time spent on Facebook would have a positive effect on the depressive symptoms.

1.2 Time spent on Facebook would have a positive effect on the perceived information overload

1.3 Perceived information overload would have a positive effect on the depressive symptoms.

Hypothesis 2: Trait rumination would moderate the relationship between perceived information overload about COVID-19 information on Facebook and depressive symptoms, hence, higher level of trait rumination would strengthen the relationship between perceived information overload and depressive symptoms.

Hypothesis 3: Trait rumination would moderate the mediation effect of the perceived information overload on the time spent on Facebook searching and receiving COVID-19 related information and depressive symptoms, hence, higher level of trait rumination would strengthen the relationship between time spends on Facebook and depressive symptoms.

Research Variables

IV: The independent variable is Facebook use, which is the time individuals have passively spent receiving and searching for COVID-19 related information on Facebook. This variable was measured by asking participants to estimate the total time per day spent on Facebook. Those who have high scores on this measurement are those who spent more time on Facebook receiving information about COVID-19.

Mediator: The mediating variable is the perceived information overload, which is the impression of receiving an extreme amount of information about

COVID-19 on Facebook that can reduce the ability to manage and evaluate the information presented. This variable was measured by the Perceived information overload scale. Individuals who have high scores on this scale indicate that they have a higher level of perceived information overload than those that have low scores.

Moderator: The moderating variable is the trait rumination, which is the individual differences in the tendency to passively and repetitively focus on the experience, causes, and consequences of their negative moods. This variable was measured by the Ruminative Response Scale-Short Form (RRS-SF). Those who have high scores on this scale are those who are likely to have ruminative thinking style.

DV: The dependent variable is the depressive symptoms, which is the range of the symptoms that negatively affect how you feel, the way you think, and how you behave. It can prolong the feeling of sadness and loss of interest which can lead to Major Depressive Disorder (MDD). This variable was measured by The Nine Patient Health Questionnaire Screening (PHQ-9). The scores on this measurement will specify the intensity of depressive symptoms that individuals have encountered in the past two weeks.

Covariates: The covariate variables are gender, age, level of education, domicile which can alter their stress level if participants could be relocated their living outside of Bangkok , number of friends in Facebook, the number of official Facebook pages and social media influencer pages that participants followed which related to the number of news and information receiving and sharing, perceived intensity of Facebook use, types of information that participants had received, and how often they participated in Facebook actively.

Chapter 2

Methodology

Participants

Regarding on the growth in popularity of SNSs among Thai users, Facebook users are not only restricted to younger generation, but also the older generation as well (Statista Research Department, 2021). Yet, the age of the most active Facebook users in Thailand ranges between 18-34. This has shown that focusing on this group of Facebook population would yield significant outcomes that might be able to generalize to other age groups. Therefore, participants in this research were non-clinical depression active Facebook users aged between 18 to 34 who live in Bangkok in the past two year. These criteria are crucial because individuals who residing in high risk areas, such as Bangkok, would positively share the similar sentiments and may develop the identical symptoms.

From Fritz and MacKinnon (2007), the minimum sample size required to conduct a mediational study with .8 statistical power to detect an effect is suggested. To estimate the appropriate sample size to test our hypothesis model, the effect size from prior studies was adopted. The range of the effect size between Facebook use and depressive symptoms is from .03 (e.g. Davila et al., 2012) up to .57 (e.g. Steers et al., 2014), with the mean of the effect size across studies of .11 from a meta-analysis by Yoon et al. (2019). Moreover, the effect sizes in the relation between Facebook use to information overload and information overload to depressive symptoms are .27 (Soroya et al., 2021) and .33 (Swar et al., 2017), respectively.

According to the results gathered and calculated in Fritz and MacKinnon (2007) study, the number of respondents required in this study using Percentile bootstrap test condition is 126. However, this method does not consider the evaluation of the moderator in the model. On that account, we then used the G*Power program (F-tests, Linear multiple regression, effect size $f^2 = 0.15$, α error probability = 0.05, power = 0.80, and number of predictors = 6), which included the moderation relationship, the total sample size should be 98 individuals. Since a larger sample can reduce the sampling error and enhance the generalizability of the study, we, therefore, concluded that it is appropriate to use the calculation result from Fritz and MacKinnon (2007) with 10 percent addition. In conclusion, a minimum sample size in this research should be 140 individuals.

Measures and Materials

Facebook usage; Time Spent

Facebook usage was assessed by asking participants to estimate their total time per day spent on Facebook searching and receiving information about COVID-19 situation in these past two weeks. Participants were provided with open-ended boxes for the answer. The total time was converted to minutes for analysis.

Depressive symptoms

The Nine Patient Health Questionnaire Screening (PHQ-9); Thai version (Lotrakul et al., 2008) was used to evaluate depressive symptoms. The PHQ-9 consists of nine-item assessing the depression which combines acceptable screening precision while reducing participant burden. Items were asked, over the last 14 days, about the frequency of experiencing feelings of failure or have let yourself or your

family down, been bothered by some of the feelings that had been listed in the questions, and being so fidgety or restless that you thought that you would be better off dead or of hurting yourself in some way. Response options for each item ranged from 0 (‘not at all’) to 3 (‘everyday’). Total scores ranged from 0 to 27. The validated and recommended clinical cut-points were categorized as follows: ‘none to slight’ (<7), ‘mild’ (7-12), ‘moderate’ (13-18), and ‘severe’ (≥19). However, for the statistical analysis, we used the numeric results which gave more specificity to the interpretation and relation between variables. The PHQ-9 is a National Institutes of Health initiative that administers standardized, validated, and reliable self-reported measurement tools across several health domains. The PHQ-9 had satisfactory internal consistency (Cronbach's alpha) of .79 (Lotrakul et al., 2008). Correlation scores between PHQ-9 and Hamilton rating scale for depression (HRSD-17) were calculated Pearson’s product-moment correlation of .719 ($p < 0.001$; Kongsuk et al., 2010) and also showed moderate convergent validity ($r = .56$; $p < 0.001$) in Lotrakul et al. (2008). The sensitivity, specificity, and positive likelihood ratios were .85, .72, and 3.04 (95% CI = 2.16-4.26), respectively (Kongsuk et al., 2010). All the scale items and the scale development procedure are in Appendix A. In the present study, Cronbach’s α for the PHQ-9 was 0.85.

Information overload

Perceived Information overload about COVID-19 measurement was back-translated and adapted from Soroya et al’s (2021). Respondents were asked to rate each statement with the 4-point scale. Respondents selected a number ranging from 1 to 4 reflecting the degree of their agreement upon each scale item, with 1 equals strongly disagree to 4 equals strongly agree. Example of items are “I am overwhelmed

by the amount of information that I process daily from Facebook about COVID-19.", "I am often distracted by the amount of information on Facebook about COVID-19." and "There is so much information available to me on the subject of COVID-19 that I have trouble choosing what is important and what's not." The Perceived Information Overload has been found to have internal consistencies (alphas) of .85 (Soroya et al., 2021). The full measure and the measure development procedure are in Appendix B. In the present study, Cronbach's α for The Perceived Information Overload was 0.80.

Rumination

Trait rumination scale was adapted from 22 items of the Rumination Response Scale (RRS; Thanoi et al., 2011), which is already in Thai and was already tested for reliability and validity. The scale quality is considered good with the internal consistency of .90 and content validity (CVI) of .95 (Thanoi et al., 2011). Thanoi and his colleagues translated and developed the scale from the Ruminative Response Scale (Nolen-Hoeksema & Morrow, 1991). However, the original scale was overlapping with items of depression measures. By removing the overlap items, Treynor et al. (2003) had created a 10-items version of RRS called the Ruminative Response Scale-Short Form (RRS-SF) which contains two subscales of brooding and reflective pondering. Cronbach's alpha for Brooding and Pondering were .77 and .72, respectively and the overall internal consistency was .85 (Treynor et al., 2003). Together, the test-retest correlation for Brooding was r = .62, and for Pondering was r = .60 (Treynor et al., 2003). To our knowledge, the Ruminative Response Scale-Short Form (RRS-SF) have not been developed and explored in Thai samples, which hinders the performance of rumination-related studies. Therefore, in this study, we conducted the RRS-SF adapting from Thanoi et al.'s (2011) and Treynor et al.'s

(2003) which contained 9-items self-report to measure the tendency to ruminate in response to feelings of sadness and depression. Also, the respond was on a 4-point Likert-type scale (4 = almost always, 1 = almost never). All the selected scale items and the scale development procedure are in Appendix C. In the present study, Cronbach's α for the RRS-SF was 0.87.

Procedure

Non-clinical depression participants were recruited using a purposive sampling through personal conversations, Facebook messaging platforms, and snowball technique which means existing study participants recruit future participants from among their acquaintances who may be interested or eligible by forwarding the questionnaires to others by themselves. To convince and encourage the existing participants to recruit future participants, the information about the importance of the larger group of population was informed at the end of the questionnaires. The questionnaires were conducted using online platform; SurveyMonkey. The consent was obtained by using a question indicated the willingness to participate in the study, as stressed in a preliminary survey in the first section of the questionnaires consisting of a consent form, a plain language statement of the information of the study. The plain language statement was indicated that participation is entirely voluntary and they can, by their own will, choose to quit or withdraw from the study at any time without any consequences or penalties that will follow. To ensure confidentiality, participant names were not collected from surveys when entering the data. The questionnaires were continued to the screening questions section to ensure the participants' qualifications. The example of the screening questions is in Appendix D.

Participants who do not meet the criteria were not continuing to the next section of the questionnaire.

A secondary survey included questions about time spent on Facebook, Perceived Information Overload, The Ruminative Response Scale-Short Form (RRS-SF), and The Nine Patient Health Questionnaire Screening (PHQ-9). Also, their gender, level of education, domicile, the number of Facebook pages and social media influencers pages that participants followed, perceived intensity of Facebook use, types of information that participants had received, and how often they participated in Facebook actively. On average, the survey was last about 20 minutes.

After finishing all the questionnaires, participants were given a debrief in the last page before ending the questionnaires site relating to the proposal, what they may have contributed to the knowledge from participating in this study, no deception occur in the process, and were told that no identifying information will be released. As well as the contact information of the researchers in case they have any further questions or concerns about this study. Even though the study is considered as having a minimal risk to the participants' physical and psychological harms, the content of some questions (i.e. 'you would be better off dead or of hurting yourself in some way' from PHQ-9) may lead to a possibility of distress, uneasy, discomfort or somewhat unhappy. Participants were instructed to contact the researchers directly and a list of resources participants can seek after the study was provided in the debrief as well. No incentives were provided to the participants.

This study has been approved by The Research Ethics Review Committee for Research Involving Human Research Participants, Group I, Chulalongkorn University, Thailand (Study Title No. 640240).

Statistical Analysis

After the number of participants with complete data reach the expected sample size, the access to the questionnaires site was terminated automatically. Data from participants with complete data were examined for patterns of missingness, unreasonable, or unfeasible responses and eliminate them when necessary.

The correlation analysis was conducted between time spent on Facebook, perceived information overload, Rumination, and Depressive symptoms. The analyses were conducted with SPSS version 22 (IBM). The mediating role of information overload was analyzed by Hayes's PROCESS macro version 4.0 (Model 4) with the covariates as the control variables. Also, Hayes's PROCESS macro Model 15 was used to analyze the Moderated Mediation model of rumination. To test for significance, boot-strapping method was used which generated 90% bias-corrected confidence intervals (GraphPad, n.d.) from 5000 resample of the data. Confidence intervals that do not include zero indicated effects that were significant at $\alpha = 0.05$.

Chapter 3

Results

This current research was a cross-sectional descriptive study attempting to investigate the influence of time spent on Facebook searching and receiving COVID-19 related information, perceived information overload about COVID-19 on Facebook, and users' trait rumination on depressive symptoms in non-clinical populations. In questionnaires, participants responded to the time spent on Facebook, Perceived information overload, The Ruminative Response Scale-Short Form (RRS-SF), and The Nine Patient Health Questionnaire Screening (PHQ-9). Moreover, participants reported their gender, age, level of education, domicile, the number of official Facebook pages and social media influencer pages that they followed which related to the amount of news and information received and shared, the perceived intensity of Facebook use, types of information that participants had received, and the frequency that they participated in Facebook actively.

After the data collection, the research data attained were analyzed using statistical techniques in SPSS. First, the data screening of the patterns of missingness, unreasonable, or unfeasible responses were performed. Then, we eliminated them when necessary before we conducted the preliminary analyses and hypothesis testing. For all statistical tests, an alpha level of .050 was used as the significance criterion. Further, due to the directionality of our hypotheses, we used one-tailed analysis and 90% confidence interval (GraphPad, n.d.).

Sample Demographics

The majority of the research samples were women. It consisted of 103 women (73.57%) and 37 men (26.43%) with a mean age of 26.13 years (SD = 4.52). Despite all the sample having been living in Bangkok for the past two years, 60 participants (42.86%) have domicile of origin in other provinces. The average number of friends on Facebook was 1334.28 (SD = 1094.68), a number of official Facebook pages was 10.02 (SD = 20.04), and social media influencer pages that participants followed was 10.01 (SD = 18.47) (see Table 1).

Table 1

Sample demographics (N = 140)

Category		Frequency	Percent (%)
Gender	Male	37	26.43
	Female	103	73.57
Education	High school	5	3.57
	Vocational Certificate	2	1.43
	Undergraduate	96	68.57
	Masters or higher	37	26.43
Domicile	Bangkok	80	57.14
	Others	60	42.86
Type of information	1	49	35
	2	43	30.71
	3	48	34.29
Perceived Facebook uses	Much too much	26	18.57
	Barely too much	62	44.29
	The right amount	46	32.86
	Barely too little	6	4.29
	Much too little	0	0
Perceived active Facebook uses	<3	79	56.43
	3-4	37	26.43
	4-5	11	7.86
	>5	13	9.29

Note. Types of information are primary data, secondary data, and sharing data; 1 refers to having received only 1 type, 2 refers to having received only 2 out of 3 types, and 3 refers to having received all 3 types. Perceived active Facebook uses are the number of times that participants posted or shared information on Facebook in the past 2 weeks.

Preliminary Analyses

Table 2 provides descriptive statistics and correlations matrix of the study variables. The results showed that depressive symptoms were positively associated with trait rumination (r = .249, p < .01) and trait rumination (r = .555, p < .01). (r = .357, p < .01). Also, the perceived information overload was positively associated with trait rumination (r = .555, p < .01).

Table 2

Descriptive statistics and correlations for the study variables (N = 140)

Variables	Min	Max	Mean	SD	1	2	3	4
1. Time spent on Facebook	1	80	23.09	19.64	–			
2. Perceived information overload	6	20	13.01	2.68	.149	.801		
3. Trait rumination	9	34	20.15	5.50	.118	.357**	.869	
4. Depressive symptoms	0	19	6.97	4.70	.152	.249**	.555**	.854

Note. Cronbach's alphas are in diagonal cells.

**p < .01

Further, we tested the association between covariates and research variables to decide whether it is appropriate to add these potential covariates into the model. We used the point biserial correlation for the categorical covariates that is dichotomous and one-way ANOVA for the categorical covariates that have more than two groups. In table 3, the results showed that trait rumination was negatively associated with age (r = -.210, p < .05). Moreover, in table 4, there were statistically significant differences between group means of the time spent on Facebook and the perceived

active Facebook uses ($F(3,136) = 3.10$, $p < .05$). From these outcomes, we decided to put only two covariates (i.e. age and the perceived active Facebook uses) into the hypothesis models.

Table 3

Correlations for the Covariate variables (N = 140)

Variables	Time spent on Facebook	Perceived information overload	Trait rumination	Depressive symptoms
1. Gender	-.053	.137	.052	.149
2. Age	-.076	-.056	-.210*	-.059
3. Domicile	-.008	-.053	.147	.073
4. Number of Friends on Facebook	.088	-.073	-.060	-.084
5. Number of official Facebook pages	.033	.049	.012	.125
6. Number of social media influencer Facebook pages	.122	.095	.026	.138

Note. Gender and Domicile used the Point biserial correlation.

*$p < .05$

Table 4

One-way ANOVA results for the Covariate variables (N = 140)

Variables	Time spent on Facebook	Perceived information overload	Trait rumination	Depressive symptoms
1. Education	1.167	1.187	.744	.755
2. Type of Information	.140	1.247	.764	.429
3. Perceived Facebook uses	.766	.759	.650	1.797
4. Perceived active Facebook uses	3.096*	.866	1.283	.550

Note. $*p < .05$

Hypothesis Testing

This present research has three main hypotheses pertaining to a moderated mediation effect of trait rumination in the relationship between time spent on Facebook and depressive symptoms through perceived information overload, a moderation effect of trait rumination in the relationship between perceived information overload on Facebook and depressive symptoms, and a mediation effect of perceived information overload in the relationship between time spent on Facebook and depressive symptoms. For this section, each hypothesis was tested respectively. The details of the hypothesis testing are as follows:

The moderated mediation effect.

This section focuses on the conceptual framework: *Trait rumination would moderate the relationship between time spent on Facebook searching and receiving COVID-19 related information and depressive symptoms through perceived*

information overload. Together with, *trait rumination would moderate the relationship between perceived information overload about COVID-19 information on Facebook and depressive symptoms*

The PROCESS macro, model 15, version 4.0 for SPSS was used to delve into the role of the variable; trait rumination, as a moderator of the effects. The path diagram of the moderated mediation model is demonstrated in Fig. 2 (also see Table 5).

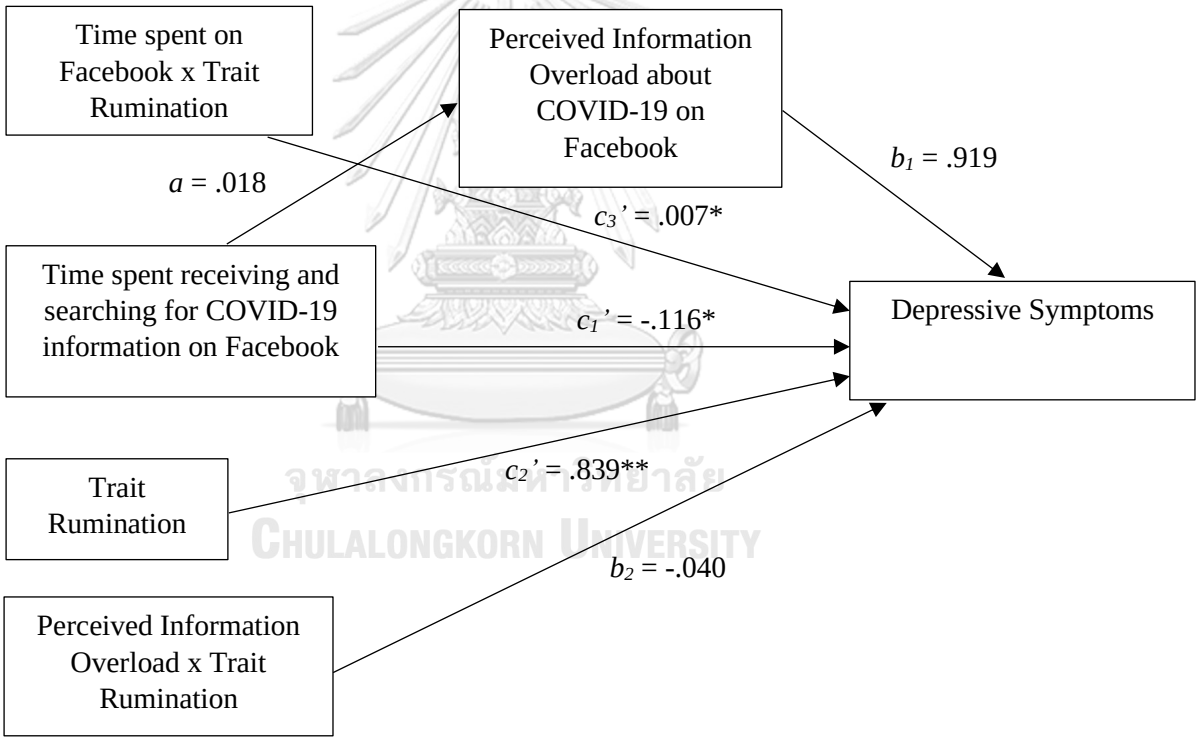

Figure 2. Moderated mediation effect
(one-tailed, *p < .05, **p < .01)

Looking at the model, it can be seen that the mediation pattern can be break into three separate paths. The results showed that time spent on Facebook did not have a significant effect on perceived information overload (a = .018, SE = .012, t =

1.551, p = .062, one-tailed) and the perceived information overload did not have a significant effect on depressive symptoms (b_1 = .919, SE = .567, t = 1.621, p = .054, one-tailed). However, the time spent on Facebook had a significant effect on depressive symptoms (c_1' = -.116, SE = .068, t = -1.726, p = .043, one-tailed).

The addition of the moderator into the model resulted in the three following paths (see also Table 5).

1. Trait rumination had a significant positive effect on depressive symptoms (c_2' = .839, SE = .336, t = 2.495, p = .007, one-tailed);

2. The interaction effect of trait rumination and perceived information overload on depressive symptoms was not significant (b_2 = -.040, SE = .027, t = -1.481, p = .071, one-tailed) and;

3. The interaction effect of trait rumination and time spent on Facebook on depressive symptoms was significant (c_3' = .007, SE = .004, t = 1.741, p = .042, one-tailed).

Further, the overall model was significant, R^2 = .349, $F(9, 130) = 9.37$, $p <$ .001, which means that, regardless of the insignificant in some relations, these variables accounted for a significant amount of variance in individuals' depressive symptoms.

Table 5

Summary Table for Moderated Mediation Effect Analysis (N = 140)

	Mediator Variable Model (DV = Perceived Information overload)					
Predictors	*b*	*SE*	*t*	*p*	90% CI	R^2
Constant	12.819***	1.398	9.168	<.001	[10.503, 15.135]	.037
Time	.018	.012	1.551	.062	[-.001, .038]	
Age	-.018	.049	-.371	.356	[-.100, .064]	
PAFBU_2	.473	.515	.919	.180	[-.380, 1.327]	
PAFBU_3	.927	1.280	.725	.235	[-1.193, 3.047]	
PAFBU_4	.548	.757	.724	.235	[-.706, 1.802]	
	Dependent Variable Model (DV = Depressive symptoms)					
Predictors	*b*	*SE*	*t*	*p*	90% CI	R^2
Constant	-13.215**	7.133	-1.853	.003	[-25.032, -1.399]	.345***
Time	-.116*	.068	-1.726	.043	[-.228, -.005]	
IO	.919	.567	1.621	.054	[-.020, 1.858]	
R	.839**	.336	2.495	.007	[.282, 1.396]	
Time x R	.007*	.004	1.741	.042	[.0003, .013]	
IO x R	-.040	.027	-1.4811	.071	[-.085, .005]	
Age	.056	.075	.740	.230	[-.069, .180]	
PAFBU_2	.227	.899	.252	.401	[-1.262, 1.715]	
PAFBU_3	.906	1.114	.814	.209	[-.939, 2.751]	
PAFBU_4	-.942	1.551	-.608	.272	[-3.512, 1.628]	

Note. Time refers to Time spent on Facebook, PAFBU to Perceived active Facebook uses, IO to Perceived information overload, R to Trait rumination, Time x R to the interaction of Time spent on Facebook and Trait rumination, and IO x R to the interaction of Perceived information overload and Trait rumination.

One-tailed analysis, *$p < .05$, **$p < .01$, ***$p < .001$.

We further probed the conditional direct and indirect effect of the trait rumination in the relationship between the time spent on Facebook on depressive

symptoms through perceived information overload as we hypothesized that the effect of the time spent on Facebook on depressive symptoms would be bigger if the trait rumination was high than when it was low and vice versa. With a simple slope analysis, the results showed that trait rumination significantly affect the association between the time spent on Facebook and depressive symptoms only when the score was 30.448 (β = .088, *SE* = .053, *t* = 1.567, *p* = .049) or higher. More importantly, the effects were getting stronger as trait rumination score increases. Even though the results were not significant across all levels of trait rumination, the conditional direct effect tends to give us results quite corresponded to our expectation.

For the conditional indirect effects, it was found that the pattern of the indirect effects was not significant across all levels of the trait rumination. Further, the index of moderated mediation was non-significant with an estimated effect of -.001 with Boot 90% CI = [-.002, .001], confirming that the trait rumination did not moderate the mediation effect of the perceived information overload between time spent on Facebook and depressive symptoms.

The mediation effect.

This section concerns the alternative model: *Perceived information overload about COVID-19 information on Facebook would mediate the relationship between time spent on Facebook searching and receiving COVID-19 related information and depressive symptoms.*

The mediation analysis Model 4 in PROCESS version 4.0 for SPSS was used to test the effects of the research variables. It was to examine whether the variable; Perceived information overload, would mediate the effect of the time spent on

Facebook and depressive symptoms. The path diagram of the mediation model is demonstrated in Fig. 3 (also see Table 6).

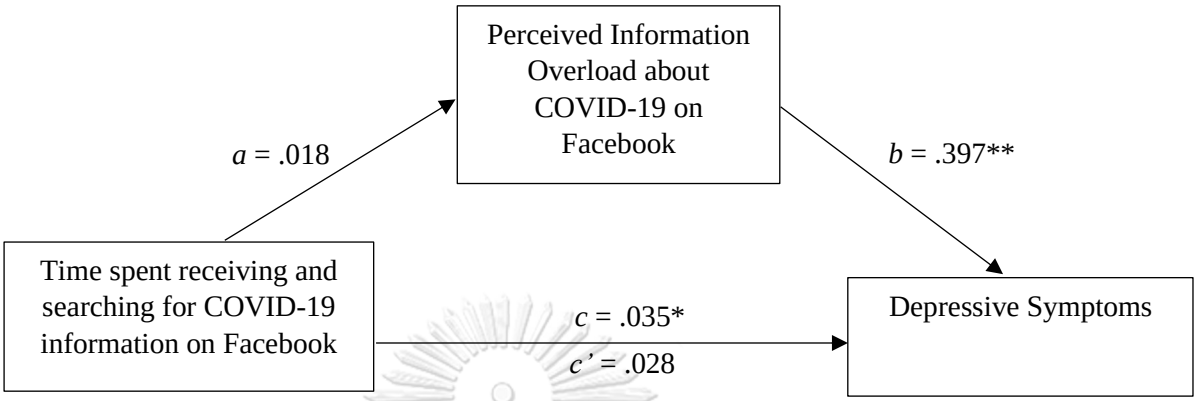

Figure 3. Mediation effect.
(one-tailed, *$p < .05$, **$p < .01$)

Primarily before the perceived information overload was added as the mediator, path c as the direct effect was significant ($c = .035$, $SE = .021$, $t = 1.680$, $p = .048$, one-tailed). It means the time spent on Facebook had a significant positive effect on depressive symptoms.

When we later added the mediator into the analysis, the additional paths are as follows:

For path a alone, the effect was not significant ($a = .018$, $SE = .012$, $t = 1.537$, $p = .063$, one-tailed). This suggests that the time spent on Facebook did not have a significant positive effect on the perceived information overload.

However, the effect of path b was significant ($b = .397$, $SE = .148$, $t = 2.678$, $p = .004$, one-tailed), which can be interpreted that the perceived information overload had a significant positive effect on depressive symptoms.

Focusing on the indirect effect, the effect ran from the path a through path b or it can be called path ab. The coefficient value of the effect was .031 (Boot *SE* = .023, Boot 90% CI = [-.001, .074]). As the 90% CI of the indirect effect did contain zero, it means the indirect effect was not significant.

Regardless of the insignificant of the indirect effect, the magnitude of the direct effect of path c' was reduced (*c'* = .028, *SE* = .021, *t* = 1.351, *p* = .090, one-tailed), and became non-significant. Also, the overall model was non-significant, R^2 = .084, *F*(6, 133) = 2.036, *p* = .065. Therefore, it can be concluded that perceived information overload did not mediate the effect of the time spent on Facebook on depressive symptoms, nonetheless, it still conveys that the direct effect of time spent on Facebook was less powerful when the mediator was entered into the model.

Table 6

Summary Table for Mediation Effect Analysis (N = 140)

Predictors	Mediator Variable Model (DV = Perceived Information overload)					
	b	*SE*	*t*	*p*	90% CI	R^2
Constant	12.819	1.429	8.972	<.001	[10.452, 15.185]	.037
Time	.018	.012	1.537	.063	[-.001, .038]	
Age	-.018	.051	-.358	.360	[-.103, .066]	
PAFBU_2	.473	.539	.878	.191	[-.419, 1.366]	
PAFBU_3	.927	.864	1.073	.143	[-.504, 2.358]	
PAFBU_4	.548	.836	.655	.257	[-.837, 1.933]	

Summary Table for Mediation Effect Analysis (Cont.)

Predictors	Dependent Variable Model (DV = Depressive symptoms)					
	b	*SE*	*t*	*p*	90% CI	R^2
Step 1						
Constant	7.273**	2.506	1.902	.002	[3.122, 11.425]	.035
Time	.035*	.021	1.680	.048	[.001, .070]	
Age	-.046	.090	-.513	.304	[-.194, .102]	
PAFBU_2	-.278	.945	-.294	.385	[-1.844, 1.288]	
PAFBU_3	1.490	1.516	.983	.164	[-1.021, 4.001]	
PAFBU_4	.437	1.467	.298	.383	[-1.992, 2.866]	
Step 2						
Constant	2.187	3.100	.705	.241	[-2.948, 7.323]	.084
Time	.028	.021	1.351	.090	[-.006, .062]	
IO	.397**	.148	2.678	.004	[.151, .642]	
Age	-.039	.088	-.442	.330	[-.184, .106]	
PAFBU_2	-.466	.927	-.503	.308	[-2.001, 1.070]	
PAFBU_3	1.122	1.488	.754	.226	[-1.343, 3.587]	
PAFBU_4	.220	1.436	.153	.439	[-2.159, 2.598]	

Note. Time refers to Time spent on Facebook, PAFBU to Perceived active Facebook uses, and IO refers to Perceived information overload.

One-tailed analysis, *$p < .05$, **$p < .01$, ***$p < .001$.

To conclude, from the mediation analysis, we found that time spent on Facebook was positively affect depressive symptoms. Moreover, the perceived information overload also had a significant positive effect on depressive symptoms. However, the perceived information overload did not mediate the effect of time spent on Facebook and depressive symptoms. In other words, spending time on Facebook searching and receiving COVID-19-related information would not be associated with depression symptoms through perceived information overload. Thus**, the first hypothesis is not supported** by the data.

Further, after conducting the moderated mediation analysis, the results showed that trait rumination by itself in fact had a significant positive effect on depressive symptoms. However, trait rumination did not moderate the effect of the perceived information overload on depressive symptoms. Moreover, even though, the interaction effect of trait rumination and time spent on Facebook on depressive symptoms was significant, trait rumination did not moderate the indirect effect of the time spent on Facebook on depressive symptoms through the perceived information overload. Therefore, **the second and third hypotheses are not supported.**

Chapter 4

Discussion

The main purposes of this research were to examine the association of the time spent on Facebook searching and receiving COVID-19 related information with negative effects; i.e. depression symptoms, through information overload in non-clinical populations. In other words, the more time individuals spend on social media platforms searching and receiving information about COVID-19, the more likely that they will receive an extreme amount of information that will enhances their psychological ill-being, stress, the feelings of cognitive strain, confusion, which leads to the formation of depressive symptoms. Also, through testing the moderated mediation model, the present study expects to find that trait rumination would moderate the effect of the perceived information overload on depressive symptoms and the indirect effect of Facebook use on depressive symptoms via perceived information overload. That is, individuals who have a high level of rumination would have greater symptoms of depression, whereas those with a low level of rumination would experience fewer depressive symptoms.

However, it seems to be important to note that, in early 2022, despite the recommendation for self-isolation, people generally did not have to stay in domestic quarantine anymore and could enhance a level of both control and freedom. This might affect to their level of negative symptoms. As can be seen in the study from Brailovskaia et al. (2020), which indicated that individuals who were not in quarantine had slightly lower symptoms of depression than individuals who were in quarantine. Further, the intensity of the COVID-19 spreading is changing continuously during the time that we conducted our research. These COVID-19 waves

could affect individuals' perception of the threat, which can either escalate or abbreviate the stress, worries, and fear toward the situation. Therefore, it is likely that the diversity of the COVID-19 conditions might influence the association between variables in this research.

As for the research results, the data analyses indicated that time spent on Facebook had a significant association with increased depressive symptoms. Moreover, the perceived information overload had a significant positive effect on depressive symptoms. However, the perceived information overload did not mediate the effect of the time spent on Facebook on depressive symptoms. Despite the significant positive effect of the trait rumination on depressive symptoms, there was no evidence of trait rumination functioning as the moderator in any relations as awaited. The discussion in this chapter will be divided into three sections as follows:

Perceived information overload as the Mediator

One of the main objectives of this current work was to probe the time spent on Facebook searching and receiving COVID-19 related information will be associated with negative effects; i.e. depressive symptoms, through perceived information overload in non-clinical populations.

Primarily with the data being analyzed, it was revealed that the higher amount of the time individuals had spent on Facebook, the higher level of depressive symptoms they would have encountered. Presumably, it denotes that the extent to which individuals develop depressive symptoms depended on their time spend on Facebook searching and receiving information about COVID-19. This result was similar to the studies from Thorisdottir et al. (2019), Steers et al. (2014), and Zhao

and Zhou (2020), which stated that participants who spent more time on social media reported more depressive symptoms.

Nonetheless, unlike the theoretical sub-prediction in the first hypothesis, the result indicates that time spent on Facebook did not significantly relate to information overload. First of all, in this data, time spent on Facebook did not significantly correlated with perceived information overload in the preliminary analysis. Another possible explanation could be that not all online platforms are creating information overload. Some research found no associations of information overload for newsfeed-based platforms such as Facebook (Matthes et al., 2020). They stated that information on Facebook is typically provided by friends and family or people who know each other personally, which gives individuals a sense of personal relevance. Therefore, such content prevents the impression of information overload (Matthes et al., 2020).

On the other hand, they found that YouTube users had a significant direct influence on information overload (Matthes et al., 2020). This kind of platform gives users more in depth information than visual- or audio-only information which could increase the sense of perceived information overload more significantly (Matthes et al., 2020). Together with the suggests additional videos based on a prior search for information that appear on the automated recommendation window, may lead to users' prolonged YouTube consumption. Being displayed to a list of recommended videos could lead to a feeling of not having enough time to handle all the available information (Cao & Sun, 2018; Matthes et al., 2020), which may cause perceived information overload. Additionally, the individual's intention to search for COVID-19 information might affect the level of information overload. For example, if

individuals believe that receiving a lot of information is necessary, the level of information overload might decrease.

Contradicting to prior result, the association between perceived information overload and depressive symptoms was significant. It is indicated that individuals who have a high level of information overload would have greater symptoms of depression, whereas those with a low level of information overload would experience fewer depressive symptoms. It was also consistent with the findings by Swar et al. (2017) and Matthes et al. (2020) that perceived information overload had a positive relationship and predicted higher levels of depressive symptoms at a later time.

As for the mediation analysis, the results showed that the time spent on Facebook searching and receiving COVID-19-related information was not associated with depression symptoms through perceived information overload. Regardless of the insignificant of the indirect effects, the direct effect was significant and the magnitude was reduced slightly when adding the perceived information overload as a mediator. Therefore, it suggests that there is a potential that when mediator is presented, the direct effect of the time spent on Facebook became less powerful. However, even though the information overload has failed as a mediator, it might have other values in itself since we discerned its significant association with the depressive symptoms.

It can be speculated that time spent on Facebook may not be a sufficient measure of social media use that could affect depressive symptoms through perceived information overload. In the multivariable model research of Shensa et al. (2017), it has found that the association between frequency of social media use and other variables remained significantly associated with depressive symptoms, whereas time did not. This finding points out an important distinction between frequency and time

of social media usage which also underlines their differing associations with depressive symptoms and other variables. To be more specific, frequency of social media use could measure more uncontrollable behavior, while time measures more intention use. Therefore, it may likely be due to an alternative mechanism, such as a addictive or problematic elements, and not simply substantial amounts of time on social media that can affect the depressive symptoms (Shensa et al., 2017) through information overload.

We have so far investigated and discussed the effects of the time spent on Facebook with depressive symptoms in conjunction with the mediating role of the perceived information overload. Even though the first hypothesis has been rejected, the question of whether the association can be strengthened or hindered still remains, the role of the research variable; Trait rumination, is the last in line to be investigated.

Trait rumination as the Moderator

From now, the trait rumination will be spotlighted on the discussion stage. By playing its given role, we expected to see bigger effects if the trait rumination was high rather than low and vice versa. The moderated mediation analysis results showed that the trait rumination had a significant positive effect on depressive symptoms, however, the conditional effects were not significant in both expected associations. It means that Hypothesis 2 and 3 are not supported.

In Hypothesis 2, before adding the trait rumination as a moderator, there was a significant association between the perceived information overload and depressive symptoms. However, after the presence of the trait rumination, the conditional effect was not significant.

One possible explanation could be that using only the level of rumination may not be able to give a significant result in terms of strengthening or weakening the relationship between perceived information overload and depressive symptoms, it may need other variables, such as negative mood or stress. Due to the fact that, some individuals may interpret all the information they received as the information they needed to keep themselves safe from the situations. Therefore, develop a positive mood by ruminating on that feeling repeatedly, which later decreases depressive symptoms. It may need to include the perspective that this excessive information creates fear, stress, and negative mood consistently which could later develop into a higher level of depressive symptoms. From the research of Pasyugina et al. (2015), rumination has been found to be enhancing negative mood and negative thinking in daily life and also increases the negative memories and appraisals, which eventually lead to increases in depressive symptoms in later time (Nolen-Hoeksema et al., 2008; Pasyugina et al., 2015).

Further, the research from Connolly and Alloy (2017) has found that rumination, together with life stress, increases depressive symptoms over time. Also, in the research of Vanderhasselt et al. (2016), rumination was higher during weeks that participants experienced a stressful event. Additionally, the stressful events together with ruminative thinking can predict the experience of depressive symptoms at 3- and 15-months follow-up (Vanderhasselt et al., 2016). From this knowledge, it showed that to be able to understand the trait rumination as a moderator in the relationship between perceived information overload and depressive symptoms better, we should add other variables (e.g. negative mood, level of stress) into the association.

In Hypothesis 3, before adding the trait rumination as the moderator, there was a non-significant indirect effect of the time spent on Facebook on depressive symptoms through the perceived information overload. Despite, after the presence of the trait rumination, the interaction effect of time spent on Facebook and trait rumination on depressive symptoms was significant, the index of moderated mediation was still not significant.

It confirms that trait rumination may not be an apposite moderator in this moderated mediation model. The research from Mitra and Rangaswamy (2019) stated that the level of rumination in the individuals who use social media excessively can hinder their mental stability, ability to process information accurately, and make individual more vulnerable to developing depressive symptoms. On that account, we advise future research to include social media addiction for a better explanation of the association. Furthermore, it indicates that even though rumination is often seen as a relatively stable characteristic (Nolen-Hoeksema et al., 2008), it is also a state-like circumstance that can be changed according to the existence or absence of certain stimuli (Smith & Alloy, 2009). Hence, combining perceived information overload with negative mood and the level of stress, together with, time spent on Facebook with addictive social media use may help clarify the association between rumination and depressive symptoms more successfully. Further, the research from Pasyugina et al. (2015) found that the increase in depressive symptoms was predicted by individual differences in the level of rumination over the week, but not in short-term emotional responsiveness to rumination in daily life. Therefore, assessing depressive symptoms over a longer period may provide additional information about the prospective influence of the rumination.

In short, the overall moderated mediation analyses suggest that trait rumination did not moderate the relationship between perceived information overload about COVID-19 information on Facebook and depressive symptoms. Moreover, trait rumination did not moderate the relationship between time spent on Facebook searching and receiving COVID-19-related information and depressive symptoms through perceived information overload. However, even though it failed as a moderator, the trait rumination might have other values in itself since we discerned its significant positive effects on depressive symptoms. Bearing this in mind, we should still see it as a precious variable that can feasibly help to understand the development of depression.

Strengths and Limitations

This present study revealed some findings that consistent with previous studies. Under our consideration, this might be due to its pronounced strengths. To begin with, the time spent on Facebook had a significant positive effect on depressive symptoms which points out another negative consequence from using too much social media even when it is necessary for individuals to connect with other people or receive important information related to the crisis they have encountered. Similar to other studies, the association between perceived information overload and depressive symptoms was significant. It helps shad the light to the effect of the excessive information about COVID-19 that could trigger the stress and fear in individuals which later can develop into depressive symptoms. Further, trait rumination was positively affected depressive symptoms. It was consistent with the Response Style Theory, which stated that individuals who have high level of trait rumination are

prone to develop depression. Additionally, we found that time spent on Facebook together with a high level of trait rumination can lead to a higher level of depressive symptoms.

Even though, all of the hypotheses were not supported, they are still considered to be a necessary information for the future researchers to take into account and be able to improve their research. Further, to the best of our knowledge, this study is one of the first that combined trait rumination with perceived information overload into one model.

A major limitation is that the cross-sectional nature of these data limits our ability to reflect possible changes in given relationships over a period of time. The longitudinal studies, such as following participants over a greater time span and with multiple time points, may be helpful in better characterizing the long-term effects of these associations. Additionally, qualitative assessments (e.g. interview and focus group) and experimental research that was conducted to describe a longitudinal significant difference in well-being in individuals who were advised to reduce their daily social media use could help draw a causal conclusion, more exclusively. Moreover, the relationship between social media use and perceived information overload should be studied in controlled experiments, as well.

It should also be noted that, since the data were collected in one specific country and province (i.e. Bangkok) and from one age group (i.e. adults aged 18–32), these findings may not generalize to other populations. Further, a younger population that is usually healthy, therefore, may not strongly experience the traits composing psychological ill-being due to their physical strength or it may not last long in them.

Future research should extend the age range used in this study, because individuals of different ages may show stronger or weaker associations.

Moreover, we relied on self-reports of social media use. Although self-reports have been considered valid in assessing individual subjective experiences, there is potential for recall bias and under-or-overestimation of time spent on social media related to COVID-19 information. Due to data protection laws and privacy issues, it is difficult to obtain more specific smartphone use data, such as data accessed from media platforms or tracking smartphone use. Therefore, self-reports are inevitable in the case of smartphone use. Still, by asking participants to report a specific frequency of use (i.e. screen time data) could be the solution to this problem. Together with the self-reported depressive symptoms, some individuals may forget about the state of psychological ill-being or underreport due to the stigmatization.

Although we have controlled for several potential confounds (i.e. age, how often they participated in Facebook actively, and mental health), still, there is a possibility that other unmeasured variables (e.g. problematic social media use, addictive social media use) might exist and explain the observed associations. Future research could further investigate the other potential confounds. Also, other possible outcomes of COVID-19 at different stages of the pandemic, such as the post-pandemic period, need to be study to further the understanding of the impacts of pandemic information exposure on individuals' psychological well-being. Further, other social media platforms such as YouTube, Twitter, or Instagram should be considered in future research, as well.

Chapter 5

Conclusion

It has been more than 2 years since the COVID-19 pandemic became the most serious international health problem in the world. Without a doubt, the COVID-19 outbreak is stressful for people and communities. To prevent the spread of the infection, the social isolation strategy was executed. It separates people from their family and friends that let many people face the psychological strain. The COVID-19 pandemic can affect individuals' mental health severely by stress, worries, hopelessness, and fatigue, which could lead to the development of depressive symptoms.

The overwhelming fear and anxiety, together with the obstruction of interpersonal communication, have increased the demand for searching for information concerning COVID-19. Since the restriction of face-to-face interaction has been adopted, social media has now become the crucial means for individuals to receive information and share their opinions, experiences, worries, and fears about the pandemic situation. On one hand, social media platforms, such as Facebook, give an update on health information related to COVID-19, which seems to decrease depression. However, on the other hand, it can also generate an immediate stream of fear about the rapid spread of disease resulting in higher rates of depression. It can be seen that the usage of social media related to COVID-19 was positively associated with negative affect and depression, suggesting that time spent on social media could be one of the critical factors for mental health issues.

Despite the fact that social media can amplify individuals with the ability to be informed and connected with other people who have been exposed to the disease directly, individuals can also be triggered by excessive or inaccurate information and develop depressive symptoms due to their intensive use of social media. Given that social media can transmit massive information in various forms which can easily increase the information production and accessibility that could lead to the experience of information overload. Therefore, individuals who received news through social media can easily perceive more information overload, resulting in psychological stress, negative emotion, and depressive symptoms.

Also, extensively and passively receiving negative information from social media could also increase levels of depressive symptoms among those with trait rumination. The social media environment provides an opportunity for an individual to ruminate on a bad situation, especially in events that are uncontrollable and uncertain such as COVID-19. However, there are individual differences in the response to depressive mood. For some individuals, cognitive response styles (i.e. rumination) may stress the negative interactions between social media use and depression more severely.

Taking everything into account, we aimed to conduct a cross-sectional descriptive study attempts to provide more understanding about how time spent on social media (i.e. Facebook) searching and receiving COVID-19-related information would predict depressive symptoms through perceived information overload about COVID-19 information, and whether non-clinical depression individuals with high trait rumination would experience higher levels of depressive symptoms. Therefore, the mediating role of the perceived information overload in the relationship between

the time spent on Facebook and depressive symptoms were investigated in hypothesis one, as well as the moderating role of the trait rumination on the relationship between the perceived information overload and depressive symptoms in hypothesis two, and the moderating role of the trait rumination on the relationship between the time spent on Facebook and depressive symptoms through perceived information overload in hypothesis three.

The questionnaire was participated by 140 non-clinical depression active Facebook users aged between 18 to 34 who live in Bangkok for the past two years. As for the findings, statistical analyses demonstrated that time spent on Facebook affects depressive symptoms. It shows that the more time individuals had spent on Facebook, the more depressive symptoms they would have. Similarly, the association between perceived information overload and depressive symptoms was significant. It indicated that the higher individuals recognized their level of excessive information, the higher they will develop depressive symptoms.

However, the perceived information overload did not mediate this relationship. Even so, our finding still provides some evidence for the problematical role of social media exposure in the context of the COVID-19 pandemic in the non-clinical population. The perceived information overload might play an important role in the development of mental health when using social media as a source of information related to COVID-19. It is worth noticing that individuals who experience a higher level of information overload exhibit vulnerability to depression. Anyhow, hypothesis 1 was, still, not supported.

For hypothesis 2 on the moderation analysis, we found that trait rumination did not moderate the relationship between the perceived information overload and

depressive symptoms. Therefore, this hypothesis was not supported. Furthermore, the third hypothesis concerning the moderated mediation effect was also not supported, as it turned out that trait rumination did not moderate the association between time spent on Facebook and depressive symptoms through the perceived information overload. Even though the trait rumination has failed as a moderator, it might have other values in itself since we discerned its significant positive effect on depressive symptoms.

Although, this present study has several limitations such as the lack of ability to reflect possible changes in given relationships over a period of time, may not be able to generalize to other populations, and the tendency for recall bias, still, it gives the impact of social media information overload on mental health disorders (i.e. depression) which may contribute to a better understanding of the psychological dynamics impacted by technology use in the time of the pandemic. Together, it might also increase awareness of how using Facebook influences non-clinical depression individuals' actions and emotions in the future.

Research Implications

This research indicates that time spent on Facebook searching and receiving information related to COVID-19 affect the level of depressive symptoms. It is in line with the Differential Susceptibility to Media Effects Model (DSMM) by Valkenburg and Peter (2013), which stated that social media usage can influence users' emotional outcomes. Although many researchers have found that time spent on social media was positively related to depressive symptoms (Steers et al., 2014; Zhao & Zhou, 2020), it is likely that individuals who use social media passively would develop the depressive

symptoms, more severely (Thorisdottir et al., 2019). The present data is consistent with this finding. Thus, our results support the negative effect of the time spent on social media on depressive symptoms. More importantly, from the researches of Bendau et al. (2021) and Ni et al. (2020), they found that to be able to identify COVID-19 related media usage that affects depression, the amount of time spent on social media platforms has to be at least 2 hours per day. However, in our research, the average time was only 23 minutes each day. Alternatively, it shows that even using social media for searching and receive information about COVID-19 in less than 2 hours per day, individuals could still develop depressive symptoms.

Not only time duration on social media could lead to depressive symptoms, but the perceived information overload could also predict higher levels of depressive symptoms (Matthes et al., 2020; Swar et al., 2017). The research from Eppler and Mengis (2004) found that information overload could increase the stress that affects individuals' ability to process and filter information, which caused psychological stress (Eppler, 2015), negative moods and emotions (Zhang et al., 2020), and depressive symptoms (Swar et al., 2017). Regarding the above findings, the current study showed a similar outcome that individuals who are faced with information overload about COVID-19 information would have a higher level of depressive symptoms.

Despite the insignificant of the trait rumination as a moderator in both relationships, the results still showed that trait rumination has a significant positive effect on depressive symptoms. This finding is in fact congruent with the Response Style Theory by Nolen-Hoeksema (1991), which stated that individuals who have a high level of trait rumination are vulnerable to prolonged negative mood, which

predicts the onset of depression. Further, it is consistent with the research from Pasyugina et al. (2015) that depressive symptoms were predicted by individual differences in the level of rumination.

Further, we found that individuals who have a high level of trait rumination is likely to have a higher level of depressive symptoms while spending time on Facebook searching and receiving information about COVID-19. This finding coherent with the research from Locatelli et al. (2012), which stated that Facebook posts affect depression via rumination.

Practical Implications

Due to the emerging situation, it is important to gain an insight into the potential associations between media consumption and pandemic-related information that could lead to the development of the mental disorder. Despite the COVID-19 situation changes daily and the current findings are only a glimpse of the COVID-19 in Bangkok in March 2022, they do not lose importance. They still contribute to the understanding of the potential consequences of the pandemic on mental health.

Despite the insignificant results in both mediation and moderated mediation analysis, our results showed the significant positive effect of time spent on Facebook, perceived information overload, and trait rumination on depressive symptoms in a non-clinical population. Therefore, it is essential to understand the individual differences in terms of the reaction to information overload and the level of rumination while using social media searching and receiving information related to COVID-19. This, in turn, could be the key to identifying individuals who are at risk

for the negative outcomes (i.e. depressive symptoms) when experiencing these effects.

It is critical for professional institutions, organizations, and authorities to strategize the intervention to keep people informed while avoiding information overload on social media. One way to reduce the contribution of information overload and psychological ill-being in online information seekers is for the most well-known healthcare organization should develop a platform for publishing consistent and unambiguous information about symptoms and possible treatments. They could also cooperate with social media platforms and conduct ‘online clinics’ to analyze false information on social media and prevent users from undergo these kind of psychological distress led by pandemic disinformation and misinformation.

Most importantly, healthcare policymakers and healthcare educators should integrate strategies to raise awareness among the pandemic-related information seekers about information overload, how to avoid or deal with it, and the importance of improving their social media competencies.

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Appendices

Appendix A

Depressive Symptoms Measurement

1. Depressive symptoms measurement

The Nine Patient Health Questionnaire Screening (PHQ-9); Thai version (Lotrakul et al., 2008) will be used to measure depressive symptoms. The instruction and scale items (see Table 7) are as follow:

"ในช่วงสองสัปดาห์ที่ผ่านมาจนถึงวันนี้ ท่านมีอาการเหล่านี้ บ่อยแค่ไหน"

Table 7

The Nine Patient Health Questionnaire Screening

ข้อ	แบบประเมินโรคซึมเศร้า (The Nine Patient Health Questionnaire Screening)
1	เบื่อ ไม่สนใจอยากทำอะไร
2	ไม่สบายใจ ซึมเศร้า ท้อแท้
3	หลับยาก หรือหลับ ๆ ตื่น ๆ หรือหลับมากไป
4	เหนื่อยง่าย หรือไม่ค่อยมีแรง
5	เบื่ออาหารหรือกินมากเกินไป
6	รู้สึกไม่ดีกับตัวเอง คิดว่าตัวเองล้มเหลวหรือเป็นคนทำให้ตัวเองหรือครอบครัวผิดหวัง
7	สมาธิไม่ดี เวลาทำอะไร เช่น ดูโทรทัศน์ ฟังวิทยุ หรือทำงานที่ต้องใช้ความตั้งใจ
8	พูดช้า ทำไรช้า จนคนอื่นสังเกตเห็นได้ หรือกระสับกระส่าย ไม่สามารถอยู่นิ่งได้เหมือนที่เคยเป็น
9	คิดทำร้ายตนเองหรือคิดว่าถ้าตาย ๆ ไปเสียคงจะดี

2. Depressive symptoms measurement development

To test the reliability of the measurements before being used in the study, a pilot study with 30 participants was conducted. Participants were non-clinical depression active Facebook users aged between 18 to 34 who live in Bangkok for the past two years. Each of them completed the scale online via Google Forms. We

distributed the survey link using purposive sampling through personal conversations, Facebook messaging platforms, and snowball technique. After receiving the survey link, prior to responding to the items, each participant was provided with a consent form consisting of the purposes of the study, the total number of questions, the explanation on the importance of giving genuine responses which would be a valuable contribution to the development of a measurement and the academic field, the assurance that no response would be judged as right or wrong, the assurance of the confidentiality of the data and the respondents' information, the contact information of the researcher, and a question indicated the willingness to participate in the questionnaires.

The measurement contains 9 items with the response options for each item ranging from 0 ('not at all') to 3 ('everyday'). The instruction for each statement is to think over the last 14 days about the frequency of experiencing feelings or being bothered by some of the feelings that had been listed in the questions, and being so fidgety or restless that you thought that you would be better off dead or of hurting yourself in some way.

After the data were obtained, we proceeded with the data analyses to evaluate the quality of our measure. The internal consistency analyses were conducted to assess the reliability of the scale items. The result indicated the Cronbach's alpha of .779 which considers an acceptable value (George & Mallery, 2003). The item-scale analysis was conducted. Corrected Item-Total Correlations (CITC) were calculated which we set the criterion for the retention of each item at the CITC greater than .400 (Gliem & Gliem, 2003). Although one of the items (DS6) showed a low CITC value of .315 (Gliem & Gliem, 2003), the decision to retain the item was taken because the

deletion of the item would have meant the loss of relevant information. Furthermore, an inspection of Cronbach's alpha after deleting an item also did a little favor to the removal of the item. The results of reliability analyses of the Depressive symptoms Scale are in Table 8.

Since none of the scale items was deleted during the process of the reliability analyses, all 9 items were retained to be used to create a measure for the research participants.

Table 8

Results of Reliability analyses of Depressive symptoms measurement

Item Codes	Items	CITC
DS1	เบื่อ ไม่สนใจอยากทำอะไร	.461
DS2	ไม่สบายใจ ซึมเศร้า ท้อแท้	.501
DS3	หลับยาก หรือหลับ ๆ ตื่น ๆ หรือหลับมากไป	.487
DS4	เหนื่อยง่าย หรือไม่ค่อยมีแรง	.411
DS5	เบื่ออาหารหรือกินมากเกินไป	.531
DS6	รู้สึกไม่ดีกับตัวเอง คิดว่าตัวเองล้มเหลวหรือเป็นคนทำให้ตัวเองหรือครอบครัวผิดหวัง	.315
DS7	สมาธิไม่ดี เวลาทำอะไร เช่น ดูโทรทัศน์ ฟังวิทยุ หรือทำงานที่ต้องใช้ความตั้งใจ	.566
DS8	พูดช้า ทำไรช้า จนคนอื่นสังเกตเห็นได้ หรือกระสับกระส่ายไม่สามารถอยู่นิ่งได้เหมือนที่เคยเป็น	.529
DS9	คิดทำร้ายตนเองหรือคิดว่าถ้าตาย ๆ ไปเสียคงจะดี	.542

Appendix B

Perceived Information Overload Measurement

1. Perceived information overload measurement

The perceived information overload measurement will be translated from the Soroya et al. (2021). The original scale items and the translated and adapted items before the scale development are in Table 9.

Table 9

Original and Adapted Perceived information overload measurement before the scale development

ข้อ	มาตรวัดภาวะข้อมูลท่วมท้น (Information overload: IO5)	มาตรวัดภาวะข้อมูลท่วมท้นภาษาไทย (Perceived information overload)
1	I am overwhelmed by the amount of information that I process daily from Facebook about COVID-19.	ฉันรู้สึกถูกปกคลุม ด้วยข้อมูลจำนวนมาก เกี่ยวกับโควิด-19 จากเฟซบุ๊ก
2	I am often distracted by the amount of information on Facebook about COVID-19.	ฉันถูกทำให้เสียสมาธิบ่อยครั้ง ด้วยข้อมูล จำนวนมากเกี่ยวกับโควิด-19 จากเฟซบุ๊ก
3	There is so much information available to me on the subject of COVID-19 that I have trouble choosing what is important and what's not.	การมีข้อมูลจำนวนมากเกี่ยวกับโควิด-19 ทำให้ ฉันไม่สามารถเลือกได้ว่า ข้อมูลไหนที่สำคัญ
4	When I search for information on COVID-19, I usually get too much rather than too little information.	เมื่อฉันสืบค้นข้อมูลเกี่ยวกับโควิด-19 ฉันมัก ได้รับข้อมูลในปริมาณที่มากเกินไป (มากกว่า ข้อมูลในปริมาณที่น้อยเกินไป)
5	I receive too much information regarding the COVID-19 pandemic to form a coherent picture of what's happening.	ฉันได้รับข้อมูลเกี่ยวกับโควิด-19 ที่มากเกินกว่า ที่จะคาดการณ์ถึงสถานการณ์ที่เกิดขึ้นจริงได้

2. Perceived information overload measurement development

According to Sperber (2004), to validate the study instruments for Cross-Cultural Research, the back-translation, the Comparability of language, and the Similarity of interpretability needed to be tested. To accomplished this step, the questionnaire is translated into the target language by the researcher and then translated back into the source language by an independent translator (Thai-Australian citizenship, Education: Bachelor of Commerce, Accounting and Finance, University of Melbourne, and Master of Business Administration, Melbourne Business School, Experience: Consultant and Analyst department at Deloitte & Touche Corporate Finance Pte Ltd, Singapore) who is blinded to the original questionnaire (see Table 10). Then compared 2 source-language versions to test the Comparability of language and the Similarity of interpretability.

The Comparability and Interpretability ratings were scored by 30 native speakers or individuals who graduated from English-based Universities. Each of them completed the scale online via Google Forms as we distributed the survey link using purposive sampling through personal conversations. Likert scales ranging from 1 (not at all comparable/not at all similar) to 7 (extremely comparable/extremely similar) are used. Comparability of language refers to how comparable is the formal wording. The similarity of interpretation means would the paired items be interpreted similarly, even if the wording is different. The interpretation of the score is any mean score <5 (1 is worst agreement; 7 is the best agreement) necessitates a formal review of the translation and any mean score between 5 and 5.5 in the interpretability column is also considered problematic and is reviewed for possible correction (Sperber, 2004).

The results showed that all the scores are higher than 5.5 which means the translation is acceptable (see Table 10).

Table 10

Perceived information overload back-translation and Results of Comparability of language and the Similarity of interpretability

Original Statements	Translation	Back-translation	Comparability of language (mean score)	Similarity of interpretability (mean score)
I am overwhelmed by the amount of information that I process daily from Facebook about COVID-19.	ฉันรู้สึกถูกปกคลุมด้วยข้อมูลจำนวนมากเกี่ยวกับโควิด-19 จากเฟซบุ๊ก	I am overwhelmed with information about COVID-19 from Facebook.	5.95	6.3
I am often distracted by the amount of information on Facebook about COVID-19.	ฉันถูกทำให้เสียสมาธิบ่อยครั้ง ด้วยข้อมูลจำนวนมากเกี่ยวกับโควิด-19 จากเฟซบุ๊ก	I am distracted by so much information about COVID-19 from Facebook.	5.95	6.2
There is so much information available to me on the subject of COVID-19 that I have trouble choosing what is important and what's not.	การมีข้อมูลจำนวนมากเกี่ยวกับโควิด-19 ทำให้ฉันไม่สามารถเลือกได้ว่า ข้อมูลไหนที่สำคัญ	Since there are so much information about COVID-19, I could not determine which information is important.	6.1	6.15

Perceived information overload back-translation and Results of Comparability of language and the Similarity of interpretability (Cont.)

Original Statements	Translation	Back-translation	Comparability of language (mean score)	Similarity of interpretability (mean score)
When I search for information on COVID-19, I usually get too much rather than too little information.	เมื่อฉันสืบค้นข้อมูลเกี่ยวกับโควิด-19 ฉันมักได้รับข้อมูลในปริมาณที่มากเกินไป (มากกว่าข้อมูลในปริมาณที่น้อยเกินไป)	When I search for information about COVID-19 often I find myself with too much information.	5.8	6.1
I receive too much information regarding the COVID-19 pandemic to form a coherent picture of what's happening.	ฉันได้รับข้อมูลเกี่ยวกับโควิด-19 ที่มากเกินกว่าที่จะคาดการณ์ถึงสถานการณ์ที่เกิดขึ้นจริงได้	I receive information about COVID-19 more than what I anticipated about the situation.	5.65	5.65

The reliability of the modified perceived information overload measurements was tested using the same 30 individuals who responded to Depressive symptoms measurement. Each of them completed the measurement online via Google Forms. The distribution of the survey link and the procedure was the same as in Depressive symptoms measurement. All of the 5 items measure respondents' impression of receiving an extreme amount of information about COVID-19 on Facebook that can reduce the ability to manage and evaluate the information presented with 4-point scale answers (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree).

After the data were obtained, we proceeded with the data analyses to evaluate the quality of our measure. The perceived information overload measurement in the pilot study had a Cronbach's alpha of .819 which consider a good internal consistency

(George & Mallery, 2003). Also, it had the CITC of each item higher than .400 which is also acceptable (Gliem & Gliem, 2003). The results of reliability analyses of the perceived information overload measurement are in Table 11.

Since none of the scale items was deleted during the process of the reliability analyses, all 5 items were retained to be used to create a measure for the research participants.

Table 11

Results of Reliability analyses of Perceived information overload measurement

Item Codes	Items	CITC
IO1	ฉันรู้สึกถูกปกคลุม ด้วยข้อมูลจำนวนมากเกี่ยวกับโควิด-19 จากเฟซบุ๊ก	.531
IO2	ฉันถูกทำให้เสียสมาธิบ่อยครั้ง ด้วยข้อมูลจำนวนมากเกี่ยวกับโควิด-19 จากเฟซบุ๊ก	.564
IO3	การมีข้อมูลจำนวนมากเกี่ยวกับโควิด-19 ทำให้ฉันไม่สามารถเลือกได้ว่าข้อมูลไหนที่สำคัญ	.669
IO4	เมื่อฉันสืบค้นข้อมูลเกี่ยวกับโควิด-19 ฉันมักได้รับข้อมูลในปริมาณที่มากเกินไป (มากกว่าข้อมูลในปริมาณที่น้อยเกินไป)	.613
IO5	ฉันได้รับข้อมูลเกี่ยวกับโควิด-19 ที่มากเกินกว่าที่จะคาดการณ์ถึงสถานการณ์ที่เกิดขึ้นจริงได้	.688

Appendix C

Rumination Measurement

1. Rumination measurement

The Ruminative Response Scale Short-Form (RRS-SF) will be adapted from Thanoi et al. (2011) and Treynor et al. (2003) to measure trait rumination. The original scale items and adapted items before the scale development are in Table 12.

Table 12

Original and Adapted Rumination measurement before the scale development

ข้อ	มาตรวัดการครุ่นคิด (The Ruminative Response Scale)	มาตรวัดการครุ่นคิดแบบสั้น (The Ruminative Response Scale Short-Form: RRS-SF)
1	คิดซ้ำ ๆ ถึงความรู้สึกโดดเดี่ยวของตัวเอง	
2	คิดซ้ำ ๆ ว่าคุณไม่สามารถทำงานของตนเองได้ถ้าคุณไม่ปลดปล่อยความรู้สึกนี้	
3	คิดซ้ำ ๆ เกี่ยวกับความอ่อนล้าและความรู้สึกเจ็บปวดของคุณ	
4	คิดซ้ำ ๆ ว่ามันเป็นการยากที่จะมีจิตใจจดจ่อกับสิ่งใดสิ่งหนึ่ง	
5	คิดซ้ำ ๆ ว่า คุณทำอะไรจึงสมควรได้รับสิ่งนี้	คิดซ้ำ ๆ ว่า คุณทำอะไรจึงสมควรได้รับสิ่งนี้
6	คิดซ้ำ ๆ ถึงความไม่กระตือรือร้นและขาดแรงจูงใจของตนเอง	
7	วิเคราะห์เหตุการณ์ที่เพิ่งเกิดขึ้น เพื่อพยายามทำความเข้าใจว่าเพราะเหตุใด คุณจึงอยู่ในภาวะซึมเศร้า	วิเคราะห์เหตุการณ์ที่เพิ่งเกิดขึ้น เพื่อพยายามทำความเข้าใจว่าเพราะเหตุใด คุณจึงอยู่ในภาวะซึมเศร้า
8	คิดซ้ำ ๆ ว่าคุณดูเหมือนจะไม่รู้สึกรู้สากับสิ่งต่าง ๆ	
9	คิดว่า ทำไมคุณจึงไม่สามารถทำอะไรต่อไปได้	
10	คิดว่า ทำไมคุณจึงมีปฏิกิริยาออกมาในลักษณะนี้	คิดว่า ทำไมคุณจึงมีปฏิกิริยาออกมาในลักษณะนี้
11	ปลีกตัวออกไปอยู่คนเดียว และคิดว่าเพราะเหตุใดคุณจึงรู้สึกเช่นนั้น	ปลีกตัวออกไปอยู่คนเดียว และคิดว่าเพราะเหตุใดคุณจึงรู้สึกเช่นนั้น

Original and Adapted Rumination measurement before the scale development (Cont.)

ข้อ	มาตรวัดการครุ่นคิด (The Ruminative Response Scale)	มาตรวัดการครุ่นคิดแบบสั้น (The Ruminative Response Scale Short-Form: RRS-SF)
12	เขียนว่าคุณกำลังคิดอะไรอยู่ และวิเคราะห์สิ่งที่คิดนั้น	เขียนว่าคุณกำลังคิดอะไรอยู่ และวิเคราะห์สิ่งที่คิดนั้น
13	นึกถึงเหตุการณ์ที่เพิ่งเกิดขึ้น และปรารถนาที่จะให้มันเป็นไปได้ดีกว่าที่มันเป็นอยู่	นึกถึงเหตุการณ์ที่เพิ่งเกิดขึ้น และปรารถนาที่จะให้มันเป็นไปได้ดีกว่าที่มันเป็นอยู่
14	คิดว่าคุณจะไม่สามารถที่จะมีสมาธิได้ถ้าฉันยังคงมีความรู้สึกเช่นนี้	
15	คิดว่า ทำไมคุณจึงมีปัญหามากมายในขณะที่คนอื่น ๆ ไม่มี	คิดว่า ทำไมคุณจึงมีปัญหามากมายในขณะที่คนอื่น ๆ ไม่มี
16	คิดว่า ทำไมคุณจึงไม่สามารถจัดการกับสิ่งต่าง ๆ ให้ดีกว่านี้	คิดว่า ทำไมคุณจึงไม่สามารถจัดการกับสิ่งต่าง ๆ ให้ดีกว่านี้
17	คิดซ้ำ ๆ ถึงความรู้สึกเสียใจของตัวเอง	
18	คิดถึงข้อบกพร่อง ความล้มเหลว ความผิดและข้อผิดพลาดทั้งหมดของคุณ	
19	คิดซ้ำ ๆ ถึงความรู้สึกที่ไม่อยากจะทำอะไรของตัวเอง	
20	วิเคราะห์บุคลิกภาพของคุณ เพื่อที่จะพยายามทำความเข้าใจว่า เพราะเหตุใดคุณจึงรู้สึกซึมเศร้า	วิเคราะห์บุคลิกภาพของคุณ เพื่อที่จะพยายามทำความเข้าใจว่า เพราะเหตุใดคุณจึงรู้สึกซึมเศร้า
21	ไปบางสถานที่ตามลำพังเพื่อที่จะคิดเกี่ยวกับความรู้สึกของตัวเอง	ไปบางสถานที่ตามลำพังเพื่อที่จะคิดเกี่ยวกับความรู้สึกของตัวเอง
22	คิดซ้ำ ๆ ถึงความรู้สึกโกรธตัวเอง	

2. Rumination measurement development

The Rumination measurement was adapted from the Ruminative Response Scale (Thanoi et al., 2011). The scale was previously translated and developed from Nolen-Hoeksema and Morrow's Ruminative Response Scale (RRS; 1991). There is a total of 10 items. The 5 items reflect a brooding and the other 5 items reflect a reflective pondering. All items in the newly adapted scale concern an individual's tendency to ruminate in response to feelings of sadness and depression. The response

of this measurement is on a 4-point Likert-type scale (4 = almost always, 1 = almost never).

The reliability of the adapted rumination measurements was tested using the same 30 individuals who responded to Depressive symptoms measurement and Perceived information overload measurement. Each of them completed the measurement online via Google Forms. The distribution of the survey link and the procedure was the same as the two previous measurements.

After the data were obtained, we proceeded with the data analyses to evaluate the quality of our measure. The internal consistency analyses were conducted to assess the reliability of the scale items. The analyses were to assess each factor separately and the global measure. The Cronbach's alpha for Factor 1 (Brooding) was .816 and for Factor 2 (Reflective pondering) was .831. The Cronbach's alpha for the global scale was .869 (see Table 13) which indicated a good internal consistency (George & Mallery, 2003). Also, the CITC was calculated separately for each factor, with 5 items for Factor 1 and another 5 items for Factor 2. The results of the CITC for factor 1 showed that one of the items (R6) had a CITC value of .396 which is lower than the acceptable value (Gliem & Gliem, 2003). Therefore, the decision to remove the item (R6) is applied. On the other hand, the CITC score of all the 5 items of factor 2 met the requirement (see Table 13).

Since one of the scale items was deleted during the process of the reliability analyses, the final number of items in this measurement for the study is 9 questions.

Table 13

Results of Reliability analyses of Rumination measurement

Factors	Item codes	Items	CITC
Brooding (α = .816)	R1	คิดซ้ำ ๆ ว่า คุณทำอะไรจึงสมควรได้รับสิ่งนี้	.641
	R3	คิดว่า ทำไมคุณจึงมีปฏิกิริยาออกมาในลักษณะนี้	.724
	R6	นึกถึงเหตุการณ์ที่เพิ่งเกิดขึ้น และปรารถนาที่จะให้มันเป็นไปได้ดีกว่าที่มันเป็นอยู่	.396
	R4	คิดว่า ทำไมคุณจึงมีปัญหามากมายในขณะที่คนอื่น ๆ ไม่มี	.706
	R8	คิดว่า ทำไมคุณจึงไม่สามารถจัดการกับสิ่งต่าง ๆ ให้ดีกว่านี้	.608
Reflective pondering (α = .831)	R2	วิเคราะห์เหตุการณ์ที่เพิ่งเกิดขึ้น เพื่อพยายามทำความเข้าใจว่าเพราะเหตุใด คุณจึงอยู่ในภาวะซึมเศร้า	.629
	R4	ปลีกตัวออกไปอยู่คนเดียว และคิดว่าเพราะเหตุใดคุณจึงรู้สึกเช่นนั้น	.736
	R5	เขียนว่าคุณกำลังคิดอะไรอยู่ และวิเคราะห์สิ่งที่คิดนั้น	.555
	R9	วิเคราะห์บุคลิกภาพของคุณ เพื่อที่จะพยายามทำความเข้าใจว่า เพราะเหตุใดคุณจึงรู้สึกซึมเศร้า	.684
	R10	ไปบางสถานที่ตามลำพังเพื่อที่จะคิดเกี่ยวกับความรู้สึกของตัวเอง	.552

Appendix D

Screening Questions

Table 14

Screening questions

Elements	Question	Options
Age	คุณมีอายุอยู่ในช่วงไหน ?	< 18 ปี
		18-34 ปี*
		35-51 ปี
		> 51 ปี
Using Facebook on daily basis	คุณใช้เฟซบุ๊กเป็นประจำทุกวันหรือไม่ ?	ใช้เป็นประจำทุกวัน*
		ไม่ได้ใช้เป็นประจำทุกวัน
Reside in Bangkok in these past couple of years	ช่วงเวลา 1-2 ปีที่ผ่านมา คุณได้อาศัยอยู่ในกรุงเทพฯ หรือไม่	ใช่*
		ไม่ใช่
Clinical depression diagnostic	คุณเคยได้รับการวินิจฉัยว่าเป็นผู้ป่วยโรคซึมเศร้าจากจิตแพทย์หรือนักจิตวิทยาหรือไม่ ?	เคยได้รับการวินิจฉัยว่าเป็นผู้ป่วยโรคซึมเศร้า
		ไม่เคยได้รับการวินิจฉัยว่าเป็นผู้ป่วยโรคซึมเศร้า*

Note. * legitimate answers to be selected into our study.

VITA

NAME	Vidchuda Taechajinda
DATE OF BIRTH	20 July 1991
PLACE OF BIRTH	Bangkok, Thailand
INSTITUTIONS ATTENDED	Chulalongkorn University
HOME ADDRESS	1115/57 Setthasiri Pattanakarn, Pattanakarn Road, Prawet Bangkok, Thailand 10250