Iranian Journal of Educational Sociology

(Interdisciplinary Journal of Education)
Available online at: http:..www.iase-idje.ir.
Volume 6, Number 4, December 2023

Resilience, Loneliness, and Impulsivity among Adolescents: A Systematic Review of the Literature

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Article history:
Received date: 2023/10/31
Review date: 2023/11/11
Accepted date: 2023/11/28

Keywords:
Resilience, Loneliness, Impulsivity, Adolescents, Systematic Review

Purpose: Individuals going through adolescence faced a significant number of changes from biological, and cognitive to social and emotional. Due to the changes experienced by adolescents, it is susceptible for adolescents to experience a high level of loneliness. The correlation between loneliness and impulsivity and the association between impulsivity and self-harm as well as self-injurious behaviors puts adolescents in a vulnerable position in performing undesirable acts or behaviors. On the other hand, resilience plays a significant role in an individual's ability to cope with an adverse situation or bounce back quickly after the undesired situation in order to maintain or regain mental health. Therefore, the objective of this study is to run review research through contemporary studies to summarize accumulative documents in the area of resilience, loneliness, and impulsivity among adolescents to investigate the mediating role of resilience.

Methodology: For this, a search was carried out on the Web of Science, Google Scholar, and PubMed. Thus, a set of keywords was used, followed by filtering main keywords, resulting in a review of 99 articles published a decade ago.

Findings: The results demonstrated that the number of adolescents having mental illness increased significantly over the years, and adolescents aged 16 and above are at risk of mental disorders. Besides that, this research revealed that adolescents in Malaysia are at risk of peer and social rejection, which is highly associated with loneliness and also has a correlation with aggression and impulsivity.

Conclusion: It was seen that loneliness and impulsivity are essential risk factors for adolescents' mental health and resilience can consider effective cognitive and coping skills for adolescents. It was also perceived that most of the papers focus on the investigation of the correlation between loneliness, impulsivity, and resilience, being necessary to develop more experimental studies on the effectiveness of resilience therapy for adolescents' enrichment. These results serve as a source of reference for future research.

Please cite this article as: Jia Yun L, Motevalli S, Abu Talib M, Gholampour Garmjani M. (2023). Resilience, Loneliness, and Impulsivity among Adolescents: A Systematic Review of the Literature, **Iranian Journal of Educational Sociology.** 6(4): 1-17.

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[DOI: 10.61186/ijes.6.4.1]

1. Introduction

Individuals transitioning into adolescents are going through a vulnerable stage in their life (Zhou et al., 2020). Li and colleagues (2019) mentioned that adolescence is an important developmental stage in an individual's life cycle and they define adolescents as a transitioning period from childhood to adulthood. Some researchers defined adolescents as individuals who are in the age range of 13 years old to 17 years old (Obeid et al., 2019), while other researchers categorized adolescents as individuals in their age of 10 years old to 19 years old (Hashim et al., 2016). With regards to adolescents, a similar explanation was made by researchers noting that individuals in their adolescent years are going through a series of changes ranging from biological, and cognitive to socio-emotional changes (Li et al., 2019; Zhou et al., 2020). These changes experienced by adolescents are extremely stressful (Pérez-Fuentes et al., 2019), which puts them at risk of using inappropriate strategies to cope with the difficulties they faced (Li et al., 2019). It is evident that adolescents are more vulnerable to exposing themselves to certain inappropriate behavior such as substance use, alcohol abuse (Pérez-Fuentes et al., 2019), phone and internet addiction (Obeid et al., 2019; Ma et al., 2020), psychological problems such as anxiety and depression (Merz et al., 2018), eating disorders (Evans et al., 2019), and even engaging in self-harm or self-injurious behaviors (Lockwood et al., 2020).

This phenomenon of risk-taking behaviors and self-harm behaviors are closely related to the level of impulsivity in adolescents (Li et al., 2019; Lockwood et al., 2020; Obeid et al., 2019). Impulsivity is defined as an individual's inclination of performing certain behaviors spontaneously, without foreseeing the undesirable outcomes or potential danger associated with their acts (Li et al., 2019). Merz and colleagues (2018) give a similar explanation mentioning that impulsivity is an individual's immediate reaction to a certain situation without considering the broad consequences of their actions. Some researchers have identified parts of an individual's brain such as the frontal lobe that play a role in manipulating the level of impulsivity in individuals (Merz et al., 2018), however, the exact causes of impulsivity remained debatable (Khurana et al., 2018). It is mentioned that individuals with high levels of impulsivity are more vulnerable to engaging in risk-taking behaviors and had undesirable outcomes (Martínez-Loredo et al., 2018). One study noted that impulsivity is highly related to externalizing behaviors such as disobeying rules, aggression towards others, or behaviors that violate social norms rather than internalizing behaviors, such as anxiety and depression (Merz et al., 2018). Another study supported this idea by mentioning that impulsivity is found to be a trait characteristic in individuals who appear to be more aggressive (Pérez-Fuentes et al., 2019). Other than aggression, individuals with higher levels of impulsivity are correlated to negative outcomes such as internet addiction (Obeid et al., 2019), drug and alcohol use (Martínez-Loredo et al., 2018; Pérez-Fuentes et al., 2019), eating disorder (Evans et al., 2019) and self-harm behaviors (Lockwood et al., 2020).

Besides impulsivity, adolescents are also susceptible to feelings of loneliness (Zhou et al., 2020). Loneliness is defined as an individual's negative emotions elicited from a deficit in a social relationship (Zhou et al., 2020). It is mentioned in one study that individuals in their adolescence stage are in a sensitive period of social development and those who were socially deprived are more vulnerable to mental health problems such as low self-esteem (Lyyra et al., 2021). However, some researchers argued that individuals as young as 10 years old start to feel lonely if they faced rejection in school and at home (Ayhan & Beyazit, 2021). Individuals with high levels of loneliness are not only associated with negative mental health outcomes (Lyyra et al., 2021) but have an impact on behavioral outcomes (Ma et al., 2020). Ma and colleagues (2020) mentioned that together with parents' negligence, adolescents' sense of loneliness has an association with behavioral problems such as phone and internet addiction. Although adolescents' development and social changes are inevitable, engagement in positive social interactions played a part as a protective factor against adolescents' feelings of loneliness (Zhou et al., 2020).

With regards to the feeling of loneliness and level of impulsivity among adolescents, the current study aimed to explain the relationship using resilience. Resilience is defined as an individual's ability to cope with an adverse situation or bounce back quickly after the undesired situation in order to maintain or regain mental health (Richter et al., 2019). The study of resilience has proven to be beneficial to individuals in various areas such as physically, psychologically, and mentally and associated with positive

[DOI: 10.61186/ijes.6.4.1]

outcomes (Yuan, 2021; Rosenberg et al., 2018; Arslan, 2019; Richter et al., 2019; Gowda et al., 2019). It served as a protective factor in various mental health as well as behavioral outcomes (Gowda et al., 2019). Not only that, but resilience also acts as a protective factor against social isolation (Arslan, 2019; Richter et al., 2019). A study concluded that there is a significant negative relationship between social exclusion and resilience (Arslan, 2019; Víllora et al., 2020). Besides that, individuals who showed higher levels of resilience are significantly related to higher levels of self-esteem and confidence (Arslan, 2019). A study suggested that an individual's resilience is not a stable trait but rather can be trained or modified (Yuan, 2021). It is discovered that resilience is able to help adolescents to cope with negative emotions, and hence beneficial to mental health (Yuan, 2021; Izydorczyk et al., 2019). The study of Lee and colleagues (2019) mentioned that individuals with high levels of resilience significantly decreases the risk of having depression in young male after military training. Resilience is also negatively correlated with vulnerability to self-harm and suicide attempts, where a higher level of resilience decreases an individual's vulnerability or risk of self-harm (O'Connor et al., 2021). Besides that, a study showed that resilience is positively correlated to emotional intelligence, assisting individuals to cope with negative emotional states and facilitating problem-solving skills (Izydorczyk et al., 2019). It can be assumed that individuals with a higher level of resilience have e lower tendency to use inappropriate ways to cope with negative states such as stress.

Since resilience played an important role as a protective factor for individuals (Richter et al., 2019), the present study aims to investigate the mediating role of resilience in the relationship between loneliness and impulsivity among adolescents in Malaysia, the sing cognitive discrepancy model of loneliness. The independent variable, loneliness will be defined as an individual's negative emotions elicited from deficits in a social relationship (Zhou et al., 2020). The dependent variable, impulsivity will be defined as an individual's tendency of reacting to certain situations spontaneously without considering the broad consequences (Li et al., 2019). The mediating variable, resilience will be defined as an individual's ability to cope with an adverse situation in order to regain mental health (Richter et al., 2019).

Theoretical Framework

The cognitive discrepancy theory of loneliness will be utilized to explain the current study. This cognitive discrepancy model was developed by Peplau and Perlman (1982) to explain loneliness, as outlined in figure 2. Similarly, to what other scholars suggested, the cognitive discrepancy theory proposed that the feeling of loneliness is a personal, negative, and upsetting event stemming from an inconsistency between one anticipated social relationship and the actual relationship that the individual has achieved (Blair & Lacy, 1993). The inconsistency between the ideal social relationship and the actual social relationship resulted in feelings of loneliness (Peplau & Perlman, 1982). It is also mentioned that the mismatch is correlated with certain situations and life events, including relocation or migration, the death of loved ones, or the commencement of disability (Burholt & Scharf, 2014). As an example, degrading physical or mental health affected an individual's capability to preserve or uphold expected levels of social interaction (Burholt & Scharf, 2014).

Cognitive discrepancy theory suggested that in order to decrease or avoid feelings of loneliness, an individual should address the mismatch between an ideal and actual social relationship (Peplau & Perlman, 1982) (Figure 2). This can be achieved by either adjusting one's expectations in regards to the quality and quantity of social relationships or enhancing their social relationship to close the gap and balance out the elements (Burholt et al., 2017). However, the gap between expectations and achieved social relationships does not directly or unavoidably lead to feelings of loneliness (Burholt et al., 2017). It was mentioned that the feeling of loneliness may be influenced by an individual's reaction to the situation and cognitive processes (Peplau & Perlman, 1982). It was suggested that perceived control, social comparison causal attributes, and labeling might influence feelings of loneliness (Peplau & Perlman, 1982). As research proposed, an individual's feelings of loneliness will then influence one's behavior (Lyyra et al., 2021).

In regards to the current study, adolescents' feelings of loneliness can be explained by this cognitive discrepancy theory. If adolescents have a lesser perceived control and resilience, they are more prone to feelings of loneliness (Burholt et al., 2017). With this, it can be inferred that if adolescents acquire the

[DOI: 10.61186/ijes.6.4.1]

cognitive capacity of resilience, the subjective feelings of loneliness may be influenced. Hence this will affect their behavioral outcome, which presence, impulsivity (Merz et al., 2018).

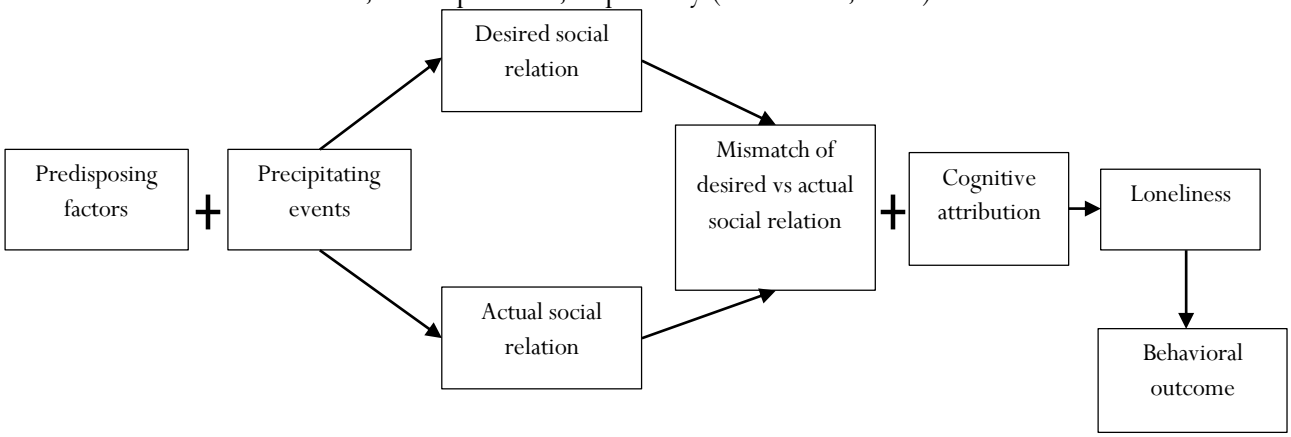

Figure 2. *Cognitive discrepancy theory of loneliness adopted from* Peplau and Perlman in 1982

2. Methodology

This section describes and explains the main aspects of impulsivity, loneliness, and resilience (e.g., definition, dimensions, contributing factors, and outcomes) in the studies on adolescents was carried out. The review was based on the qualitative methodology through four steps: collection, descriptive analysis, selection of categories, and evaluation of the material. This type of review uses methods that can be replicated to identify, select, and evaluate papers in the literature on the subject of research studied. We searched for primary studies in the main collection of the Web of Science, Google Scholar, and PubMed using four sets of keywords identified by the authors during a brainstorming process. These consisted of search terms that were considered to be obligatory for this study to collect the relevant information to the main terms on adolescents' mental health; a set of words related to loneliness, impulsivity, and resilience by paring items; and a set of words related to correlational studies between loneliness and impulsivity; and items by focusing on mediation role of resilience to loneliness and impulsivity. After applying the filters due to consider the exclusion criteria, 99 articles were obtained for review.

3. Findings

From the systematic literature review, some analyses were performed on the 99 articles selected. These articles were analyzed as to their general characteristics (e.g., definition, dimensions, contributing factors, and outcomes) so as to extract data on adolescents' mental health in greater detail.

Impulsivity

Definition of Impulsivity. The definition of impulsivity is widely discussed in the literature, and most of the studies give similar definitions were mentioned that impulsivity is an individual's tendency of performing a behavior spontaneously, without foreseeing the undesirable outcomes or potential danger associated with their acts (Li et al., 2019; Merz et al., 2018). Other words used by the study include risky, hasty as well as inappropriate behaviors that lead to negative outcomes (Ioannidis et al., 2019). From the biological perspective, impulsivity is explained as the lack of inhibitory control as well as the automatic responses an individual gives in a situation (Lee et al., 2019). There were no contradicting definitions but however, but impulsivity is gradually being conceptualized as a multidimensional construct (Curry et al., 2018; Rømer Thomsen et al., 2018), which defined impulsivity through four dimensions, being seeking for sensation, negative urgency, lack of perseverance, and lack of premeditation (Mestre-Bach et al., 2020; Bőthe et al., 2019).

Dimensions of Impulsivity. As mentioned above, scholars have explained impulsivity with four dimensions (Mestre-Bach et al., 2020; Bőthe et al., 2019). Sensation seeking referred to an individual's willingness to participate in activities that are enjoyable and exciting, but also one's openness to

[DOI: 10.61186/ijes.6.4.1]

experiences that might pose harm or danger (Bőthe et al., 2019). Negative urgency is referred to an individual's immediate urgency to reduce negative emotions at that moment (Curry et al., 2018). On the other hand, lack of perseverance is explained as individuals who faced challenges in staying on task, and are easily distracted while the lack of conscientiousness (Linhartová et al., 2021; Bőthe et al., 2019). Premeditation referred to an individual's ability to think before performing an action, and in this case, lack of premeditation is explained as an individual acting on the situation without prior cognitive processing of the possible consequences (Bőthe et al., 2019; Curry et al., 2018). It is found that sensation seeking reached a universal peak among adolescents (Khurana et al., 2018), and was positively correlated with behavioral problems like gambling disorders (Mestre-Bach et al., 2020) and problematic sexual behavior (Bőthe et al., 2019; Curry et al., 2018). Besides that, studies have evidenced that sensation seeking and negative urgency are significantly correlated with externalizing behaviors and psychopathologies (Curry et al., 2018; Kim & Choi, 2020). Negative urgency together with lack of premeditation is evident to be the response to negative emotions and it is strongly correlated to substance abuse, alcohol, and drug use (Kim & Choi, 2020). The lack of perseverance and the lack of premeditation is on the other hand correlated to gambling disorders, drinking problems, and problematic sexual behaviors (Mestre-Bach et al., 2020; Curry et al., 2018; Linhartová et al., 2021; Bőthe et al., 2019).

Factors Contributing to Impulsivity. Studies have identified a few biological factors that are related to impulsivity (Bell et al., 2022; Herman & Duka, 2019; Kozak et al., 2019). At the present, it was found that the prefrontal cortex and frontal lobe of an individual's brain are related to the level of impulsivity (Bell et al., 2022; Passamonti et al., 2018). An experiment conducted by Bell and colleagues (2022) explored that an overly stimulated prefrontal cortex significantly increases an individual's impulsivity, especially in the area of dishonesty and aggression. This finding is supported by another study, which concluded that individuals with inappropriate consumption of nicotine and substance use tend to show more signs of impulsivity due to the stimulation of the prefrontal cortex from drug ingestion (Flores et al., 2022; Kozak et al., 2019). Besides that, an increase in physical impulsivity is evident to be a significant effect of alcohol use (Herman & Duka, 2019). The initiation and continuation of consumption of alcohol are found to be one of the predisposing factors to impulsivity (Herman & Duka, 2019). The not only misuse of alcohol and other substance, the degeneration of the frontal lobe of the brain, especially in patients diagnosed with Parkinson's disease is highly correlated to impulsivity (Passamonti et al., 2018).

The outcome of Impulsivity. A study mentioned that impulsivity is highly correlated with externalizing behaviors (Merz et al., 2018). This statement is acknowledged and supported by other studies showing that there is a number of negative outcomes related to impulsivity among adolescents, which includes internet and gaming addiction (Li et al., 2019; Obeid et al., 2019); gambling (Cosenza et al., 2019; Martínez-Loredo et al., 2018); impulsive eating behavior (Booth et al., 2018); as well as inappropriate substance and drug use (Prat et al., 2019; Martínez-Loredo et al., 2018). One study concluded that adolescents with higher levels of impulsivity are significantly correlated to internet addiction, and are often times associated with negative outcomes such as psychological disorders, physical problems, and poor academic performance (Li et al., 2019). Similar results yield from a study, concluding that impulsivity is one of the key predictors of adolescents' gambling (Obeid et al., 2019). However, impulsivity alone is not able to explain gambling behavior rather an individual's ability to understand their own mental state played an important role in predicting the severity of gambling (Cosenza et al., 2019). It was also evident that in a regression analysis, impulsivity contributed the most to explaining internet addiction among other variables such as depression, aggression, and social fear (Obeid et al., 2019). Besides that, one of the dimensions of impulsivity, premeditation was found to be the key risk factor for uncontrollable eating behavior, which in turn contributed to obesity (Booth et al., 2018). Other than that, researchers found that individuals who are less likely or have challenges with exercising cognitive control over their urges are more likely to develop problematic drug use (Rosenbaum & Hartley, 2019). The finding is supported by Khurana and colleagues (2018) mentioning in their study that individuals'

[DOI: 10.61186/ijes.6.4.1]

ability to prioritize delayed gratification, which is negatively associated with impulsivity are at higher risk of drug abuse.

Loneliness

Definition of Loneliness. The study of loneliness dated back to the 1970s and it was back then defined as an aversive experience followed by sadness, anxiousness, and feelings of being left out (McWHIRTER, 1990). Other literature defined loneliness similarly with some mentioning that loneliness is an internal, subjective negative effect that arises when an individual's social relationship experienced a quantitative or qualitative loss (Bandari et al., 2019; Zhou et al., 2020; Ayhan & Beyazit, 2021). Another study mentioned that loneliness is a pervasive experience and individuals who feel lonely felt distressed too and described that feeling as social pain (Kung et al., 2021; Prohaska et al., 2020). On the other hand, scholars described that loneliness is a broad range of experiences elicited from temporary separation from an individual's close acquaintances to a more permanent state of disconnection (Bandari et al., 2019; Kung et al., 2021). However, McWHIRTER (1990) noted that loneliness does not occur only because there were insufficient social relationships, but rather the relationship did not meet the individual's expectations on its significance or quality. This statement is supported by De Jong Gierveld (1998) as well as Motta and Motta (2022) claiming that loneliness is beyond availability or number of social interactions, but rather a discrepancy between individual's actual social interaction and their desired frequency and quality. Though the term loneliness is used in various studies, most scholars define loneliness similarly.

Loneliness in Adolescents. A recent study has drawn attention to the disproportionately high levels of loneliness among adolescents and young adults (Matthews et al., 2021). It is found that loneliness is highly prevalent among adolescents and young adults from age 12 to approximately mid-20s (von Soest et al., 2020; Matthews et al., 2021; Wong et al., 2018). Partially due to the COIVD-19 pandemic and school closure, adolescents reported a higher level of loneliness in recent years (Cauberghe et al., 2021; Loades et al., 2020). Adolescents are at a critical developmental stage going through significant transitions, in which they are establishing independence for the first time, and adapting to various changes in sociodemographic, family, emotional, and personality (von Soest et al., 2020; Li et al., 2019; Zhou et al., 2020). This idea is supported by a study mentioning that adolescents are more vulnerable to feelings of loneliness due to the fact that they are starting to distance themselves from their caregivers but are yet to fully integrate into society and peers (Goossens, 2018). A longitudinal study exploring loneliness in adolescents aged 12 discovered that feelings of loneliness showed stability when the same adolescent is being assessed again at age 18 (Matthews et al., 2021). However, these findings are opposed by von Soest and colleagues (2020) claiming feelings of loneliness increase from early adolescents to age mid-20s, and only plateau and remain stable after the age of mid-20s.

Factors Contributing to Loneliness. The feelings of loneliness have grown to become a public health concern, and it has proven to have a significant impact on physical and mental health (Lim et al., 2018). Although literature could not identify a sole cause to explain loneliness, a few factors are being discussed by scholars (Lim et al., 2020; Ben Simon & Walker, 2018). Genetic studies concluded that there were a small number of genes that contribute to loneliness partially overlapping with genes contributing to neuroticism (Spithoven et al., 2019). However, there was insufficient evidence to conclude that genetics alone is able to explain feelings of loneliness, but rather the interaction of this predisposition with the environment (Spithoven et al., 2019; Finlay & Kobayashi, 2018). On the other hand, age showed a non-linear quadratic relationship with loneliness, where it showed that individuals in their 20s experiences the highest level of loneliness (Nguyen et al., 2020). Other than that, the study concluded that loneliness is significantly associated with social factors such as social isolation (Finlay & Kobayashi, 2018), perceived social support (Kelly et al., 2019), smaller social network, not having a spouse or partner, low prosocial behaviors (Nguyen et al., 2020). It was also mentioned that individual factor such as sleep disturbance, low self-efficacy, and anxiety has a correlation with loneliness (Nguyen et al., 2020).

[DOI: 10.61186/ijes.6.4.1]

The outcome of Loneliness. The lack of social connection brought about various outcomes physically and psychologically (Wang et al., 2018; Christiansen et al., 2021; Abdellaoui et al., 2019). Physically, loneliness has been strongly associated with health outcomes such as obesity, cardiovascular diseases, and metabolic disorders (Christiansen et al., 2021). Even though literature mentioned that sleep disturbance is one of the possible contributing factors to loneliness (Nguyen et al., 2020), the feelings of loneliness are also evident to affect an individual's sleep (Solmi et al., 2020). Besides that, loneliness is suggested to have a positive correlation with cognitive functioning (Groarke et al., 2021). As such, the higher the level of loneliness, the higher the chances of an individual having dementia, paranoia, and other psychotic symptoms (Groarke et al., 2021; Solmi et al., 2020). On the other hand, various studies have proven the relationship between loneliness and its psychological outcomes (Wang et al., 2018; Groarke et al., 2021; Okruszek et al., 2020). Individuals who experienced prolonged feelings of loneliness are evident to have worse mental health outcomes (Li & Wang, 2020). In most of the studies, scholars agreed that loneliness has a strong positive association with depressive symptoms (Wang et al., 2018; Park et al., 2020; Okruszek et al., 2020). In another study, it is mentioned that loneliness is significantly associated with suicidal attempts (Solmi et al., 2020). There are many more psychological outcomes associated with loneliness such as anxiety, schizophrenia, and bipolar disorder in these recent years due to the COVID-19 pandemic (Okruszek et al., 2020; Li & Wang, 2020; Groarke et al., 2021).

Resilience

Definition of Resilience. Scholars have defined resilience in many different ways and in various contexts, being in the psychology field, health care, and academic field (Richter et al., 2019; Pooley & Cohen, 2010; Dulin et al., 2018). The most common definition of resilience by literature ais s an individual's ability to cope with an active situation or bounce back quickly after an undesired situation in order to maintain or regain mental health (Richter et al., 2019; Pooley & Cohen, 2010). Similar definitions were made mentioning that resilience acts as a positive psychological, behavioral or social adaptation resource when an individual is faced with stressors and adversities (Dulin et al., 2018). Other scholars described resilience as a process of adaptation to an adverse situation such as stress, traumatic experiences, or tragedy (American Psychiatric Association, 2013). Windle (2011) however, mentioned that resilience is a personal quality or personality trait denoted as the ability to overcome a difficult situation. This idea is opposed by Yuan (2021) suggesting that resilience is not a stable trait but rather can be trained. Most of the studies had identified resilience as a protective factor that aids individuals in recovering from the adverse situation (Rosenberg et al., 2018; Arslan, 2019; Richter et al., 2019; Gowda et al., 2019). As of the present date, there are no contradicting definitions made by scholars in regards to resilience, and the current study will adapt the most commonly used definitions.

Factors Associated with Resilience. Literature mentioned that resilience does not occur on its own, but rather is associated with other factors (Wahyudi & Partini, 2018; Newman, 2002). Having a positive interpersonal relationship is evident to be one of the contributing factors to an individual's resilience (Lou et al., 2018; Wahyudi & Partini, 2018). The study suggested that children and adolescents who had positive social support are more likely to receive help when they are in need (Yildirim & Tanrýverdi, 2020). Alongside the help and support received during difficult times, individuals developed competency in problem-solving and efficacy when they are faced with problems (Hamill, 2010; Konaszewski et al., 2021). With this, it is tied to the fact that individuals with more sense of efficacy have higher levels of resilience as they are able to find ways around the stress they faced and bounce back quicker than individuals with lower levels of resilience (Konaszewski et al., 2021). Other than that, another factor associated with resilience is confidence (Wahyudi & Partini, 2018). It is suggested that having self-confidence is a supporting factor for resilience, as individuals who believed that they are able to overcome adverse situations even without the support of others are able to cope with that situation itself (Newman, 2002). Furthermore, it is found that having positive thinking does contribute to the formation of resilience (Maheshwari & Jutta, 2020). A sense of optimism allowed individuals to look into alternatives when they are faced with adverse situations and recover from stressful moments more effectively (Sabouripour et al., 2021).

[DOI: 10.61186/ijes.6.4.1]

The Relationship between Loneliness and Impulsivity

A study of loneliness with participants of various ages was conducted and most of the studies concluded a significant relationship with impulsivity (Wei & Madon, 2019; Lockwood et al., 2020). It was found that loneliness alongside major depressive disorder is at a higher risk of impulsivity, which was portrayed as the risk of performing a suicidal attempt (Louie et al., 2021). A study conducted with adolescents during the COVID-19 pandemic and quarantine suggested that the duration of quarantine has an effect on feelings of loneliness (López Steinmetz et al., 2021). The study further explained that during that period of time, adolescents were experiencing higher levels of impulsivity and were at a higher risk of committing suicide (López Steinmetz et al., 2021). This finding is supported by Costa and colleagues (2021) mentioning that individuals who engage in self-injurious behaviors score significantly higher on loneliness and impulsivity scales. Besides that, it was evident that loneliness is positively associated with emotional dysregulation, and the relationship is associated with impulsiveness in the area of food addiction (Eirini et al., 2019). A similar study yielded a similar conclusion where the authors concluded that loneliness is significantly correlated to food addiction and impulsivity among adolescents (Dinçyurek et al., 2018). Besides that, impulsivity which acted as a risk factor for gaming disorder was evident to have a significant relationship with loneliness among adolescents (Li et al., 2021). However, another study mentioned that loneliness is inversely related to impulsivity in the area of impulse buying, where individuals who felt lonelier are less likely to engage in impulsive spending, but other decision-making measures were not taken into consideration (Wong, 2021). This finding is contradictory to findings from Arda and Andriany (2019) arguing that adolescents who felt lonely or have a social relationship that is not up to expectations tend to find ways of escape and engages in impulse buying behavior.

The Mediating Role of Resilience to Loneliness and Impulsivity

A study conducted among adolescents mentioned that adolescents with high levels of impulsivity and behavioral approach system directly predicted problematic internet use or internet addiction (Li et al., 2019). This study is consistent with a study conducted by Olenik-shemesh (2020) evident that adolescents' level of impulsivity significantly correlated with problematic internet use, and adding on those low levels of resilience together with high levels of loneliness mediated the impulsivity of problematic internet. However, one study revealed that even though resilience could act as a protective factor against loneliness and impulsivity, it included gender difference as one of the moderating effects in the study (Nam et al., 2018). Besides that, it was mentioned in a study that individuals with her resilience showed a lower score in cognitive impulsiveness and non-planning impulsiveness on the BIS-11 scale (Zhou et al., 2022). On the other hand, a study conducted in China found that loneliness is significantly associated with suicide ideation, with resilience as a significant mediator of the relationship (Zhang et al., 2021). Since suicide ideation, self-harm, and the suicide attempt is highly correlated to impulsivity (Lockwood et al., 2020), it can be inferred that resilience mediated the relationship between loneliness and impulsivity. The previous findings are partially supported by another study which is evident that resilience is able to mediate the relationship between loneliness and depressive symptoms, instead of impulsivity (Zhao et al., 2018). Therefore, the current study aimed to identify the mediating role of resilience in the relationship between loneliness and impulsivity among adolescents in Malaysia.

Discussion

This section discussed the significant results and gaps from the review of the literature in the areas of loneliness, impulsivity, and resilience among adolescents.

Studies have found that loneliness is highly correlated with mental health issues among adolescents (Lyyra et al., 2021; Orben et al., 2020). Lyyra and colleagues (2021) also mentioned that adolescents are at a heightened risk of perceiving loneliness and social isolation. Due to the various changes faced by adolescents, it is evident that 75% of adults who are facing mental health issues first develop their symptoms before the age of 24 (Orben et al., 2020). A study conducted in Malaysia mentioned that the number of adolescents in Malaysia having mental illnesses increased significantly over the years, and adolescents aged 16 and above are at risk of mental disorders (Kamarulzaman & Jodi, 2018). Besides that,

[DOI: 10.61186/ijes.6.4.1]

adolescents are more vulnerable to feelings of worry, and facing stress in schools increases their chances of experiencing high levels of loneliness (Ayhan & Beyazit, 2021) which in turn is associated with having internalizing issues such as anxiety and depressive symptoms (Obeid et al., 2019). In a longitudinal study, it was mentioned that loneliness is associated bidirectionally with low self-esteem, depressive symptoms, and internet addiction (Zhou et al., 2020). It this also evident that adolescents engaged in problematic substance use as a coping strategy to their negative affect, with a significant increase in prevalence from 7% to 40% over the recent years (Zakaria et al., 2021).

The correlation between loneliness and impulsivity (Wei & Madon, 2019), and the association between impulsivity and self-harm as well as self-injurious behaviors (Lockwood et al., 2020) puts adolescents at risk of performing undesirable acts or behaviors. A study revealed that adolescents who engage in self-harm behaviors are at a considerable risk of committing suicide in the future, and the risk persists over several years (Hawton et al., 2020). A three years analysis of adolescents' suicide rate between the year 2017 to the year 2019 found there is a minimum of 4.9 and a maximum of 6.1 per 100,000 population suicide cases; and an estimation of 5 deaths due to suicide daily in the year 2019 (Lew et al., 2022). It is found that an alarming rate of 7 out of 100 adolescents engaged in self-injurious behaviors and about half of them attempted suicide (Ibrahim et al., 2019). The study also mentioned that 6.3% of individuals aged 16 to 19 reported the highest number of suicide ideation (Ibrahim et al., 2019). Although one of the studies proposed that impulsivity might be biologically inherited (Merz et al., 2018), there is a psychological protective factor such as resilience that is negatively correlated to impulsivity in adolescents (O'Connor et al., 2021).

The gap identified in this review paper is the inclusion of resilience in the relationship between loneliness and impulsivity. Out of the 99 articles used in this paper, only 3 articles have identified resilience as a mediating factor between loneliness and impulsivity among adolescents. Since resilience was identified as a potentially protective factor against loneliness and impulsivity among adolescents, this paper aims to promote the study of resilience among adolescents. These results reveal some opportunities for future research studies, such as i) including resilience as one of the study variables related to adolescents; ii) studies focusing on the preventative measures to loneliness among adolescents; iii) studies that explore resilience training among adolescents; and iv) studies focusing on other intervention in reducing impulsivity among adolescents.

4. Conclusion

In short, the cognitive discrepancy theory of loneliness explained that an individual's subjective feelings of loneliness are influenced by the mismatch of ideal and achieved social relations together with cognitive processes and attributes. The definition of impulsivity is similar across literature where it mentioned that impulsivity is an individual's tendency of performing certain behavior before considering its possible negative outcomes. There were also four dimensions of impulsivity, which are sensation seeking. negative urgency, lack of perseverance, and premeditation. Some biological factors such as the frontal lobe of the brain are closely related to impulsivity, while alcohol and substance use are found to correlate with impulsivity too. The outcomes of impulsivity, on the other hand, were closely related to externalizing behaviors. Loneliness is defined as an individual's subjective negative feelings or effects elicited from a lack of social interaction or relationship. It was found that adolescents in their transition stage are more susceptible to feelings of loneliness. One of the factors that contributed to feelings of loneliness is the discrepancy between ideal and achieve social relations, and literature reported negative mental health outcomes from individuals who often feel lonely. Resilience is the ability to bounce back and regain normal mental health after going through an adverse situation. It was mentioned in a study that resilience is not a fixed trait but rather can be trained or malleable. Research suppers the relationship between loneliness and impulsivity, as well as the mediating role of resilience in the relationship between loneliness and impulsivity.

[DOI: 10.61186/ijes.6.4.1]

Ethical Considerations
Ethical standards were observed in this research.

Acknowledgments
Gratitude and appreciation were expressed to the participants of this study.

Authors' Contributions
The authors actively and fully collaborated.

Conflict of Interest
There is no conflict of interest among the authors.

[DOI: 10.61186/ijes.6.4.1]

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