

LONELINESS AND COGNITIVE VULNERABILITY FACTORS: A SYSTEMATIC REVIEW FOCUSED ON MALADAPTIVE COGNITIONS

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Abstract

We aimed to identify and report data from studies investigating associations between loneliness and maladaptive cognitions.

Eighteen studies were included in the present systematic review. Findings generally supported positive associations between loneliness and maladaptive cognitions, and this pattern was consistent across different types of cognitions. Maladaptive cognitions may represent vulnerability factors for loneliness, but given that most evidence comes from studies reporting cross-sectional data in convenience samples, further research is needed to clarify the nature and dynamic of the association.

Existing studies provide evidence for a relation between loneliness and maladaptive cognitions, and support the relevance of further research on this topic.

Keywords: loneliness; cognitive vulnerability; maladaptive cognitions; maladaptive schemas.

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Humans long for connections, and when a disparity occurs between the desired and actual quality and quantity of their social relationships, the aversive state of loneliness emerges (Heinrich & Gullone, 2006; Peplau & Perlman, 1982). Unlike social isolation, which refers to the objective state of having a reduced number of relationships (Hawkley & Cacioppo, 2010), or solitude, which describes a voluntary state of social distancing (Ong et al., 2015), loneliness is an experience characterized by subjective distress (Hawkley & Cacioppo, 2010). Transitory feelings of loneliness are common and thought to be adaptive, as they may signal a problem with social connections and motivate repair (Cacioppo & Hawkley, 2009). However, when loneliness is prolonged or severe, it loses its adaptive value, becoming a threat to wellbeing (Surkalim et al., 2022).

Given its increased prevalence among all age groups (Qualter et al., 2015), and its associations with a variety of physical and mental health problems (e.g., Holt-Lunstad et al., 2015; Wang et al., 2018), loneliness has been described as a public health concern (Hawkley & Cacioppo, 2010; Heinrich & Gullone, 2006), and research devoted to understanding and reducing this phenomenon has increased over the past years (Holmes et al., 2020). However, studies have mainly focused on objective factors that influence loneliness, while its subjective features remain less understood.

Still, prior work underscores their relevance. Research applying an emotion regulation framework indicates that loneliness is associated with decreased utilization of cognitive reappraisal, on the one hand, and increased propensity for self-blame, rumination, and catastrophizing, on the other (see Preece et al., 2021; Tan et al., 2022). As such, it points out cognitive factors. Indeed, socio-cognitive models emphasize the importance of cognitive factors in the emergence and maintenance of loneliness. For example, Hawkley and Cacioppo (2010) hypothesize that perceived social isolation leads to feelings of unsafety and hypervigilance to social threats, which trigger cognitive biases in the processing of social information. These biases elicit behaviours in oneself and subsequently from others that confirm the negative social expectations of lonely people, and lead to further distancing from potential social partners, and a self-reinforcing loneliness loop (Hawkley & Cacioppo, 2010).

A review (Heinrich & Gullone, 2006) documents this negative cognitive pattern, drawing attention to the self- and other-directed negative views (e.g., low self-esteem, inferiority, mistrust, cynicism etc.). Likewise, a more recent review of studies on the relation between information processing biases and loneliness supports this association (Spithoven et al., 2017), but other cognitive vulnerability factors have been investigated less. Among these, maladaptive cognitions are crucial, in light of their implications for psychopathology (e.g., Bridges & Harnish, 2010),

considering that loneliness is highly comorbid with various mental health issues (Erzen & Çikrikci, 2018; Maes et al., 2019; Shevlin et al., 2015).

Supporting this view, Young (1982) described “core lonely thoughts” (i.e., general cognitive structures shared by most lonely people), and “loneliness clusters” (i.e., content-specific structures consisting of automatic thoughts and maladaptive assumptions, and associated behavioural and emotional manifestations - e.g. low self-concept, mistrust, intimate rejection etc.). Nonetheless, the link between loneliness and specific maladaptive cognitions has not yet been synthesized. The goal of the current systematic review was to document findings of studies investigating this relation. Therefore, we focused on maladaptive cognitions in light of their status as cognitive vulnerability factors.

Method

We conducted a systematic search in four bibliographic databases (PsychInfo, Scopus, PubMed and Web of Science). The search was conducted in April 2023, using keywords and truncated terms related to *loneliness* (loneliness OR “social isolation” OR lonel* OR solitude) and *maladaptive cognitions* (schema* OR “maladaptive schemas” OR “cognitive schemas” OR “early maladaptive schemas” OR EMS OR “maladaptive cognitions” OR “dysfunctional attitudes” OR “automatic thoughts” OR “irrational beliefs”).

Study Selection

Study selection was conducted in line with PRISMA guidelines (Moher et al., 2009) and is depicted in Figure 1. The search yielded 614 records of which 290 remained after duplicate removal. Abstracts were screened, indicating 66 potentially relevant records. We had access to 61, and contacted the authors for the remaining 5 records. Following non-response from authors, 61 records were read full-text. Inclusion criteria were: (a) primary studies published in peer-reviewed journals, (b) in English that (c) investigated associations between loneliness and maladaptive cognitions (i.e., irrational beliefs, automatic thoughts, intermediate beliefs, core beliefs, early maladaptive schemas, and other cognitive schemas). Eighteen studies met inclusion criteria.

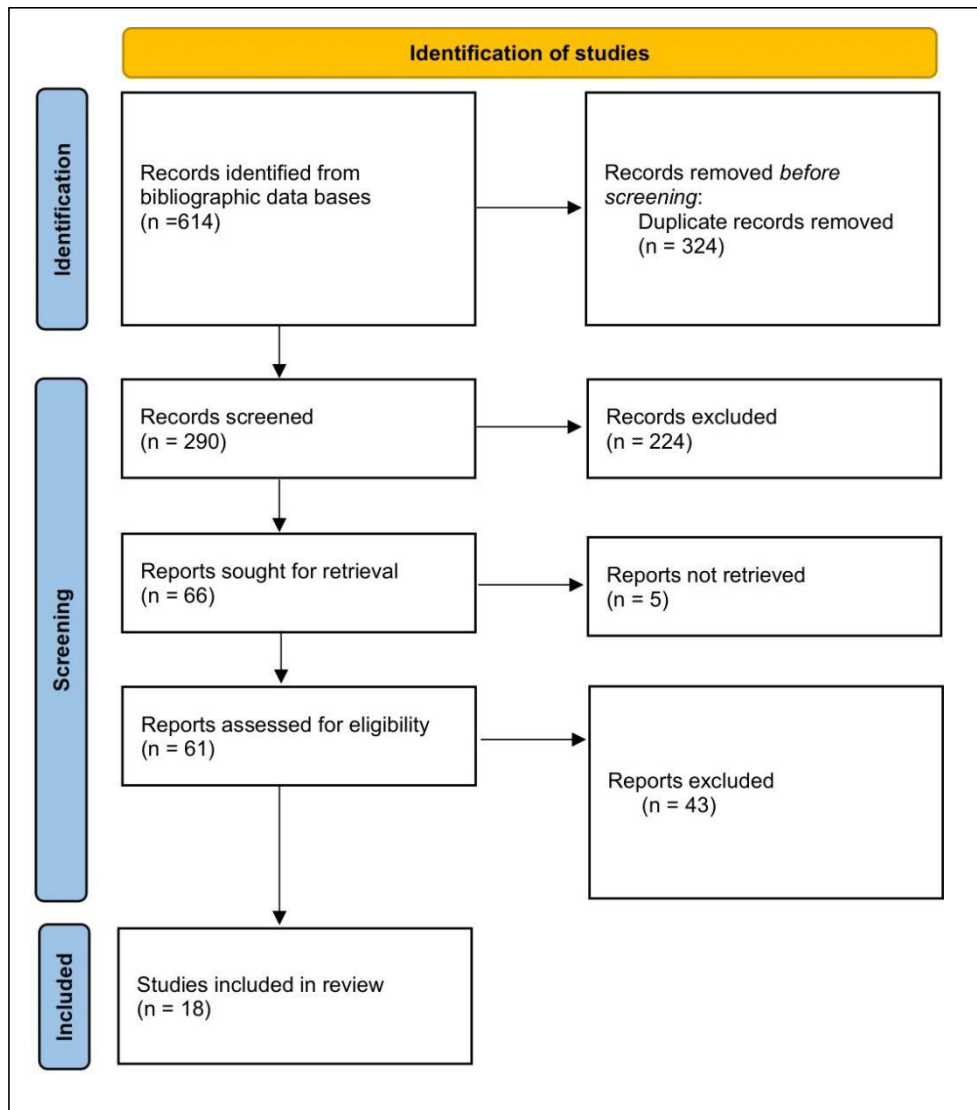


Figure 1. Prisma flowchart describing the selection of studies

Procedure

Two coders extracted study characteristics (Table 1). Consistent with our objective, a narrative review was performed.

Table 1. Study characteristics

Study	Country	N	Mean age (sd)	% F	Sample type	Clinical status	Study design	Relevant cognitions	Cognition measure	Loneliness measure	Key findings
Besser et al., 2022	Israel	462	28.41 (8.59)	75.5	students	non-clinical	cross-sectional	automatic thoughts (negative & positive); loneliness automatic thoughts	Automatic Thoughts Questionnaire - Short (ATQ-S; Netemeyer et al., 2002); Positive Automatic Thoughts Questionnaire (ATQ-P - 5 item adapted version; Ingram et al., 1995); Loneliness Automatic Thoughts Questionnaire (LATQ; Flett et al., 2021)	UCLA Loneliness Scale (8-item version; ULS-8; Hays & DiMatteo, 1987)	Loneliness was positively and strongly associated with negative and loneliness-related automatic thoughts, and negatively and strongly associated with positive automatic thoughts
Bonner & Rich, 1987	USA	158	NR	63.2	students	non-clinical	cross-sectional	irrational beliefs	Rational Behavior Inventory (RBI; Shorkey & Whiteman, 1977)	UCLA Loneliness Scale (ULS; Russell et al., 1978)	Loneliness was negatively and moderately associated with irrational beliefs
Bonner & Rich, 1990	USA	146	28.28 (6.67)	0	inmates	NR	cross-sectional	irrational beliefs	Rational Behavior Inventory (RBI; Shorkey & Whiteman, 1977)	UCLA Loneliness Scale (ULS; Russell et al., 1978)	Loneliness was negatively and moderately associated with irrational beliefs
Bonner & Rich, 1991	USA	178	NR	NR	students	non-clinical	longitudinal study reporting cross-sectional data	irrational beliefs	Rational Behavior Inventory (RBI; Shorkey & Whiteman, 1977)	UCLA Loneliness Scale (ULS; Russell et al., 1978)	Loneliness was positively and strongly associated with irrational beliefs
Botter et al., 2022	The Netherlands	1	63 (NR)	0	adult	clinical (personality disorder, substance use disorder, and cognitive	case study	early maladaptive schemas and schema modes	Young Schema Questionnaire (YSQ-L2 - Dutch adaptation; Rijkeboer et al., 2005); Schema Mode Inventory (SMI - Dutch adaptation; Lobbestael et al., 2010)	NR	Feelings of loneliness decreased as a result of a schema therapy individual treatment

Study	Country	N	Mean age (sd)	% F	Sample type	Clinical status (impairments)	Study design	Relevant cognitions	Cognition measure	Loneliness measure	Key findings
Chau et al., 2022	China	2089	23.63 (3.67)	68.4	adults	non-clinical	cross-sectional	core beliefs (negative and positive self & other-related beliefs)	The Brief Core Schema Scale (BCSS; Fowler et al., 2006)	UCLA Loneliness Scale (version 3; ULS-v3; Russell, 1996)	Higher levels of negative core beliefs (self and other-related) increase the chances of falling within a profile described by high loneliness and high psychopathology; higher levels of positive core beliefs (self and other-related) decrease the chances of falling within a profile described by high loneliness and high psychopathology
Halamandaris & Power, 1997	UK	124	24.4 (8.68)	69.4	students	non-clinical	cross-sectional	dysfunctional attitudes	The Dysfunctional Attitudes Scale (DAS; Weissman, 1980)	Revised UCLA Loneliness Scale (R-ULS; Russell et al., 1980)	Loneliness was positively and strongly associated with dysfunctional attitudes
Hyland et al., 2019	UK & Ireland	397	23.33 (7.91)	50.4	students	non-clinical	cross-sectional	irrational beliefs	The Attitudes and Belief Scale 2 - Abbreviated Version (ABS2-AV; Hyland et al., 2017)	UCLA Three-Item Loneliness Scale (ULS-3; Hughes et al., 2004)	Loneliness was positively and strongly associated with irrational beliefs. The tested model comprising of four irrational beliefs explained 36% of the variance in loneliness
Jalilian et al., 2023	Iran	338	25.09 (5.02)	75.7	students	non-clinical	cross-sectional	early maladaptive schemas (specific schemas pertaining to disconnection-rejection and other-directedness)	Young Schema Questionnaire (YSQ-SF; Young et al., 2003)	Social and emotional loneliness scale for adults (SELSA-S; DiTommaso et al., 2004)	Loneliness was positively and strongly associated with schemas from the disconnection and rejection domain. Loneliness presented a weak but positive association with schemas from the other-directedness domain

Study	Country	N	Mean age (sd)	% F	Sample type	Clinical status	Study design	Relevant cognitions	Cognition measure	Loneliness measure	Key findings
Jarvis et al., 2019	South Africa	32	74.93 (6.41)	81.3	adults (elderly, living in healthcare facilities)	NR	randomized controlled trial	early maladaptive schemas pertaining to disconnection-rejection	Young Schema Questionnaire - short form (YSQ-SF - Dutch version; Rijkeboer et al., 2005)	The De Jong Gierveld Short Scales for Emotional Loneliness (De Jong Gierveld & Van Tilburg, 2010)	The association between early maladaptive schemas and loneliness was not directly investigated. Decreases in loneliness levels at post-test were considered to be the result of EMS reduction at post-test
Lamster et al., 2017	Germany	65	40.49 (12.61)	56.9	adults	clinical (schizophrenia spectrum disorders)	cross-sectional	core beliefs (negative other-related beliefs)	The Brief Core Schema Scale (BCSS; Fowler et al., 2006)	UCLA Loneliness Scale (version 3; ULS-v3; Russell, 1996)	Loneliness was positively and strongly associated with other-related core beliefs
Leonova et al., 2021	NR	144	39.67 (6.12)	100	adults	non-clinical	cross-sectional	early maladaptive schemas (all); dysfunctional attitudes	Young Schema Questionnaire (YSQ-S3R - Russian adaptation; Kasyanik & Romanova, 2016); Dysfunctional Attitude Scale (DAS; Beck, 1979)	UCLA Loneliness Scale (version 3; ULS-v3; Russell, 1996)	Loneliness was positively and moderately associated with abandonment/ instability, social isolation/alienation, dependence/ incompetence, failure, and approval-seeking schemas, and positively and weakly associated with self-sacrifice schema; loneliness was positively and moderately associated with dysfunctional attitudes.
Moghadam et al., 2018	Iran	300	NR	NR	children (middle school students) and their mothers	non-clinical	cross-sectional	early maladaptive schemas (all - mother)	Young Schema Questionnaire - short form (YSQ-SF; Young, 1998)	Child Loneliness Scale (CLS; Asher & Wheeler, 1985)	Child loneliness was positively associated with all five maternal schema domains (medium to large associations)

Articles Section

Study	Country	N	Mean age (sd)	% F	Sample type	Clinical status	Study design	Relevant cognitions	Cognition measure	Loneliness measure	Key findings
Reinhard et al., 2022	Germany	133	33.9 (12.8)	71.4	adults	mixed (including persistent depressive disorder and healthy controls)	cross-sectional	schema modes	Schema Mode Inventory - revised (SMI-R - German adaptation; Reiss et al., 2012)	Revised UCLA Loneliness Scale (R-ULS; Russell et al., 1980; German adaptation: Döring & Bortz, 1993)	Loneliness was positively and strongly associated with child modes (vulnerable child, undisciplined child), coping modes (bully and attack) and punitive modes (punitive parent); loneliness was negatively and strongly associated with contented child and healthy adult modes
Segel-Karpas & Ermer, 2021	USA	2130	64.81 (8.39)	50	adults	non-clinical	longitudinal	other cognitive schemas (i.e., cynical hostility)	Cook-Medley Hostility Inventory (Ho Scale; Cook & Medley, 1954; Costa et al., 1986)	UCLA Three-Item Loneliness Scale (ULS-3; Hughes et al., 2004)	For both men and women, loneliness (T1) presented positive weak to strong cross-sectional associations with cynical hostility (T1); loneliness (T2) presented positive and moderate longitudinal associations with cynical hostility (T1)
Serin et al., 2019	Turkey	287	NR	85.7	students	non-clinical	cross-sectional	dysfunctional attitudes	Dysfunctional Attitudes Scale (DAS - 10 item Turkish version; Batmaz & Ozdel, 2016)	NR	Loneliness was associated with dysfunctional attitudes; the direction and strength of the association were not reported.
Shareh et al., 2022	Iran	105	20.74 (2.98)	51.4	adults with gender dysphoria	Clinical	cross-sectional	emotional schemas	Leahy emotional schema scale (LESS; Leahy, 2002)	UCLA Loneliness Scale (ULS-v3; Russell, 1996)	Loneliness was positively and moderately associated with emotional schemas
Wilbert & Rupert, 1986	USA	50	18.9 (NR)	60	students	non-clinical	cross-sectional	dysfunctional attitudes	The Dysfunctional Attitudes Scale (DAS; Weissman, 1980); Young Loneliness Diagnostic Scale (YLD; Young, 1981)	Revised UCLA Loneliness Scale (R-ULS; Russell et al., 1980)	Loneliness was positively and strongly associated with dysfunctional attitudes

Notes: % F – percentage of females; NR - not reported

Findings

Study characteristics

Most studies used cross-sectional designs (77.8%) and employed non-clinical samples (66.7%). A minority of studies were conducted on clinical (16.6%) and mixed samples (5.6%) or samples where the clinical status was unclear (11.1%). Populations consisted of either students (44.4%) or other adult groups (50%); only one study was conducted on children (Moghadam et al., 2018). Information on mean age of participants and gender was generally included (77.8% and 88.9%, respectively), but could not be determined for all studies. Studies varied in terms of type of maladaptive cognitions they focused on and in terms of maladaptive cognitions measures, but little heterogeneity was observed concerning loneliness (see Table 1).

Loneliness and Irrational Beliefs

Irrational beliefs are maladaptive thinking patterns that lack logical, empirical, and functional support (Ellis, 1994; David et al., 2019). Four types of irrational beliefs have been described (i.e., demandingness, catastrophizing, low frustration tolerance, and global evaluation of self/others/life, Ellis, 1977; David et al., 2019), and have been related with a variety of emotional and behavioural problems (see Browne et al., 2010 for a review).

Albeit limited, there is evidence suggesting that irrational beliefs may be relevant for loneliness, with several studies reporting significant associations between loneliness and irrational beliefs (Bonner & Rich, 1987; 1990; 1991; Hyland et al., 2019). Three older studies (Bonner & Rich, 1987, 1990, 1991) measured loneliness using the UCLA Loneliness Scale (ULS; Russell et al., 1978), and irrational beliefs with the Rational Behaviour Inventory (RBI; Shorkey & Whiteman, 1977). However, only one (Bonner & Rich, 1990) reported the scoring method for the RBI, although several distinct scoring methods are available for this measure (Thyer et al., 1981). In this study, loneliness was negatively associated with low RBI scores, which indicate the presence of high levels of irrational beliefs. Given that it is unclear how RBI scores were computed in the other two studies (Bonner & Rich, 1987, 1991), their findings should be interpreted with caution.

A more recent study (Hyland et al., 2019), found a positive relation between loneliness measured with the Three-Item Loneliness Scale (ULS-3; Hughes et al., 2004), and irrational beliefs measured with the Attitudes and Belief Scale 2-Abbreviated Version (ABS2-AV; Hyland et al., 2017). Irrational beliefs explained 36% of the variance of loneliness, and mediation analyses showed that increased levels of demandingness contributed to increased levels of loneliness through catastrophizing and self-downing. When the rational/adaptive alternatives of these beliefs were considered, the model explained 23% of the variance in loneliness (Hyland et al., 2019).

While these studies provide support for an association between loneliness and irrational beliefs, they all employ cross-sectional designs. Although there is one longitudinal study, data on the relation between loneliness and irrational beliefs are reported cross-sectionally (Bonner & Rich, 1990). More research is therefore needed to clarify this relation. Moreover, even though loneliness is a common experience across age groups (Qualter et al., 2015; Surkalim et al., 2022), all of the above studies were conducted on adults samples of either students (Bonner & Rich, 1987, 1991; Hyland et al., 2019) or inmates (Bonner & Rich, 1990).

Loneliness, Core Beliefs, Dysfunctional Attitudes and Automatic Thoughts

According to Beck (1979), interpreting and responding to life events is grounded in cognitive structures labelled cognitive schemas, which develop as a result of early life experiences (Beck & Bredemeier, 2016). Core beliefs are fundamental propositional structures within these schemas (Dozois & Beck, 2008). Dysfunctional views about oneself (e.g. unlovable, worthless, etc.) and others (e.g., rejecting, untrustworthy, etc.), which serve as an input for future negative expectations, play an important role in generating emotional and behavioural problems (Beck & Bredemeier, 2016).

Models of loneliness emphasize the importance of negative self- and other-related beliefs in problematic loneliness (Hawkley & Cacioppo, 2010). Although scarce, existing data support an association between loneliness and maladaptive core beliefs. For example, in a study that investigated the co-occurrence of loneliness with various symptoms, Chau et al. (2022) found that higher levels of positive core beliefs were associated with a decreased probability of loneliness, while higher levels of negative self- and other-related core beliefs were associated with an increased probability of loneliness. In latent class analysis, negative beliefs about others predicted profiles that included loneliness, but also symptoms such as paranoia suggesting that the associations may be stronger in clinical populations. A study that involved patients with schizophrenia spectrum disorders (Lamster et al., 2017) supports this hypothesis, as it reports strong positive associations between negative other evaluations and loneliness. However, given that both of these studies are cross-sectional and were conducted on adult samples consisting mostly of female participants (Chau et al., 2022; Lamster et al., 2017), this interpretation is tentative and requires further investigation.

Dysfunctional attitudes are so-called *intermediate beliefs*. They result from core beliefs, often reflect people's values, and, similar to core beliefs, they organize experience and influence feelings and behaviours (Beck, 2020; Dozois & Beck, 2008). A study conducted on a student sample found a strong positive association between dysfunctional attitudes (measured with the Dysfunctional Attitude Scale; DAS; Weissman, 1980) and loneliness (assessed with the Young Loneliness Diagnostic Scale; YLD; Young, 1981), which remained stable when controlling for depressive symptoms (Wilbert & Rupert, 1986). These results were replicated by

Halamandaris and Power (1997) who also suggest that the relation between loneliness and dysfunctional attitudes may be influenced by other factors such as extraversion, self-esteem and interpersonal mistrust. More recently, Leonova and colleagues (2021) reported positive associations between loneliness and dysfunctional attitudes, with stronger relations in the case of DAS items related to the approval of others.

Finally, automatic thoughts are situation-specific beliefs that emerge without one's control and are characterized by lack of deliberation (Dozois & Beck, 2008). While they are the most superficial level of beliefs, they stem from intermediate and core beliefs, and share similar functions (Dozois & Beck, 2008). Thus, automatic thoughts may also be relevant for loneliness, but the few studies that measure both constructs mostly look at them as parallel predictors of symptoms (e.g., depression) without reporting relations between them. We found one study (Besser et al., 2022) that reports a strong positive association of loneliness with negative automatic thoughts, and a strong negative association with positive automatic thoughts. A strong positive relation was also observed between loneliness and loneliness-specific automatic thoughts, measured with a scale specifically designed to assess these thoughts (i.e., the Loneliness Automatic Thoughts Questionnaire; Flett et al., 2021).

A limitation of the studies reviewed in this section is their cross-sectional nature. Longitudinal designs, and more diverse samples in terms of age and clinical status are needed in order to clarify the role of maladaptive cognitions in leading to and maintaining loneliness, and in distinguishing between transitory, functional feelings of loneliness, and chronic, problematic loneliness (Heinrich & Gullone, 2006).

Loneliness and Early Maladaptive Schemas

Early maladaptive schemas (EMS) are defined as “memories, emotions, cognitions, and bodily sensations regarding oneself and one's relationship with others” (Young et al., 2003, p. 7) that develop following recurrent failures to meet basic emotional needs during childhood (Bintaş-Zörer & Dirik, 2023). They impact the individual's mental health both during youth (Nicol et al., 2020) and adulthood (Thimm & Chang, 2022), and are associated with interpersonal maladjustment (Nordahl & Nysaeter, 2005) and dysfunction (Janovsky et al., 2020). While several domains of EMS have been described (see Young et al., 2003), those pertaining to the domains of *disconnection and rejection* (e.g., abandonment, mistrust/abuse, social isolation), and other- directedness (e.g., subjugation, self-sacrifice) have recently gained attention in loneliness research, with results generally reflecting positive associations between these constructs (Jalilian et al., 2023; Leonova et al., 2021; Moghadam et al., 2018).

A study that investigated relations between specific EMS and loneliness (Leonova et al., 2021) found medium positive associations with schemas of abandonment/instability, social isolation/alienation, *Loneliness and Cognitive Vulnerability Factors*

dependence/incompetence, failure, and approval-seeking, and a small positive association with self-sacrifice. Jalilian and colleagues (2023) found a similar pattern of results, with the largest associations emerging for the disconnection-rejection domain. Finally, in a study investigating the relation between mothers' EMS and their children's loneliness, Moghadam and colleagues (2018) reported medium to large positive associations between the two. These findings suggest that loneliness may also depend on others' maladaptive cognitions. Given that EMS develop in childhood, it is plausible that mothers model these cognitive patterns, which may in turn explain associations between the two reported later in life (e.g., Leonova et al., 2021).

Data also suggest significant associations between loneliness and schema modes (i.e., moment to moment, schema-driven, adaptive and maladaptive emotional and coping responses; Young et al., 2003). Reinhard and colleagues (2022) examined relations between schema modes and loneliness in adults with persistent depressive disorder and healthy controls. Patterns of associations were generally consistent across both groups, with results indicating large positive associations between loneliness and maladaptive child modes (i.e., vulnerable child, undisciplined child), coping modes (i.e., bully and attack), and punitive modes (i.e., punitive parent). Large negative associations were observed for healthy modes such as contented child and healthy adult (Reinhard et al., 2022).

A randomized controlled trial that evaluated the efficacy of low-intensity CBT in reducing loneliness in the elderly, by targeting maladaptive cognitions such as the disconnection-rejection schema, reported decreases in both loneliness and EMS following the intervention (Jarvis et al., 2019). However, considering that the study did not address the question of whether changes in EMS are associated with reductions in loneliness, it is unclear if the effect on loneliness may be attributed to changes in EMS. A case study that describes the use of schema therapy for a patient with a complex presentation of substance abuse and mixed personality disorder also reports reductions in loneliness after treatment (Botter et al., 2022), but the measure used to assess loneliness is not specified.

Although few and methodologically heterogeneous, these studies draw attention to the potential importance of EMS schemas in loneliness, particularly considering their impact on interpersonal functioning, and their established relations with interpersonal problems (see Janovsky et al., 2020 for a review).

Loneliness and other cognitive schemas

Emotional schemas are cognitive structures encompassing one's beliefs and attitudes toward emotions (Leahy, 2002). Given that loneliness is defined as a negative emotional state, emotional schemas may be relevant for how it is experienced. Shareh and colleagues (2022) investigated this hypothesis in a cross-sectional study that involved participants with gender dysphoria, and found a medium positive association between loneliness and emotional schemas. However,

further studies are needed to clarify this relation and the importance of emotional schemas for loneliness.

Finally, cynical hostility is another cognitive schema that has been linked to loneliness in a series of studies conducted by Segel-Karpas and colleagues (e.g., Segel-Karpas & Ayalot, 2020; Segel-Karpas & Ermer, 2021). Cynical hostility refers to beliefs that other people are not trustworthy and may cause one harm (Smith et al., 2004). Results of these studies indicate a bidirectional relation between loneliness and cynical hostility, both cross-sectionally and longitudinally (Segel-Karpas & Ayalot, 2020; Segel-Karpas & Ermer, 2021), supporting the hypothesis that lonely individuals have negative social expectations that end up being self-reinforced, including by the reactions they elicit from others (Hawkey & Cacioppo, 2010).

Discussion

The current review focused on factors contributing to the emergence and maintenance of loneliness, and synthesized existing data on its association with maladaptive cognitions. The review supports the hypothesis that maladaptive cognitions may be relevant in loneliness, with studies generally reporting positive associations between these constructs. Evidence seems stable across types of maladaptive cognitions and clinical conditions. Indirect support also comes from studies that report negative relations between loneliness and adaptive cognitions.

Thus, our review has several important theoretical implications. First, given the insufficiently understood subjective nature of loneliness and its underlying mechanisms, the review sheds light on factors explaining its emergence, as well as the transition from functional (temporary) to dysfunctional (chronic) loneliness. Second, it builds on existing theoretical models (Cacioppo & Hawkey, 2010) to single out potentially understudied relevant factors. To our knowledge, this review is the first one to focus on maladaptive cognitions and document their contributions to loneliness. Third, given that it indicates associations are consistent for both maladaptive cognitions about self and others, the review extends existing models that posit altered cognitive processes contribute to enhanced threat of social world, and negative self perceptions (e.g., Hawkey & Cacioppo, 2010).

Moreover, the review has practical implications, and it is timely to address issues pertaining to loneliness as a public health concern (Heinrich & Gullone, 2006). Notably, its findings are consistent with meta-analytical data advocating for interventions targeting social maladaptive cognitions (e.g. Masi et al., 2011). Given that existing interventions generally yield small effects (Masi et al., 2011), the current review suggests targeting these factors may improve treatments. As such, it advances other work focusing on loneliness and cognition (e.g., Heinrich & Gullone,

2006, Spithoven et al., 2017) and suggests interventions should target both low-level of processing social information (e.g. Jeong & Kim, 2021), and semantic processing, restructuring maladaptive cognitions (classic CBT).

However, there are some inherent limitations of the studies presented here. These ought to be considered, and subsequently addressed by future research. Given that most of the evidence comes from cross-sectional studies, and that temporal precedence between constructs cannot be established, the understanding of the interplay between loneliness and maladaptive cognitions is hampered. Although the cognitive model (Cacioppo & Hawkley, 2009) makes certain temporal assumptions, it is plausible for maladaptive cognitions to be both the effect or cause of loneliness (Spithoven et al., 2017). The only study so far reporting longitudinal data (Segel-Karpas & Ermer, 2021) found that negative cognitions predict loneliness, but more research using longitudinal designs is certainly needed to shed light on the dynamics of the relation between these variables.

Moreover, most studies examining the link between maladaptive cognitions and loneliness have been conducted on adult convenience samples, the vast majority including students, and predominantly women. While reliance on such samples is not surprising, further research is needed to generalize results to other populations. Loneliness is a common experience across the lifespan, and so are its deleterious effects (Qualter et al., 2015; Loades et al., 2020). Thus, it would be important to understand its relation with maladaptive cognitions at various ages. Similarly, clinical populations are underrepresented in the literature. However, clinical status may influence the association between loneliness and maladaptive cognitions, and should be taken into account in future research.

In addition, there is limited variability in measuring loneliness, as most studies used the ULS (Russell et al., 1978) or its alternatives. Although this scale has good psychometric properties (Alsubheen et al., 2023), it relies on a unidimensional conceptualization of loneliness (Peplau & Perlman, 1982). Yet, a more refined examination of its distinct dimensions (Heinrich & Gullone, 2006), including emotional/loneliness (Weiss, 1973), may clarify its relation with maladaptive cognitions. As such, future studies may delve into these issues using multidimensional measures of loneliness.

Finally, considering that loneliness is not always problematic and that transitory feelings of loneliness may serve adaptive purposes (Cacioppo & Hawkley, 2009), more attention should be devoted to distinguishing between temporary versus chronic loneliness, which entails a host of negative outcomes and is also more likely to be associated with maladaptive cognitions. Consequently, future research may consider using experience sampling methods (e.g., Tomoiagă et al., 2024) to differentiate between temporary and chronic loneliness. A better understanding of their involvement in loneliness could not only refine our understanding of this widespread phenomenon, but also pave the way for more efficient interventions aimed at reducing it.

Authors' Notes

Declaration of Interest. The authors declare that there are no potential conflicts of interest associated with this publication, and that any financial support has been noted in the Acknowledgment section.

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References

- Alsubheen, S. A., Oliveira, A., Habash, R., Goldstein, R., & Brooks, D. (2023). Systematic review of psychometric properties and cross-cultural adaptation of the University of California and Los Angeles loneliness scale in adults. *Current Psychology*, 42(14), 11819–11833. <https://doi.org/10.1007/s12144-021-02494-w>
- Asher, S. R., & Wheeler, V. A. (1985). Children's loneliness: A comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology*, 53(4), 500–505. <https://doi.org/10.1037/0022-006X.53.4.500>
- Batmaz, S., & Ozdel, K. (2016). Psychometric Properties of the Revised and Abbreviated form of the Turkish Version of the Dysfunctional Attitude Scale. *Psychological Reports*, 118(1), 180–198. <https://doi.org/10.1177/0033294116628349>
- Beck, A. T. (1979). *Cognitive Therapy of Depression*. Guilford Press.
- Beck, A. T., & Bredemeier, K. (2016). A Unified Model of Depression: Integrating Clinical, Cognitive, Biological, and Evolutionary Perspectives. *Clinical Psychological Science*, 4(4), Article 4. <https://doi.org/10.1177/2167702616628523>
- Beck, J. S. (2020). *Cognitive behavior therapy: Basics and beyond*. Guilford Publications.
- Besser, A., Flett, G. L., Nepon, T., & Zeigler-Hill, V. (2022). Personality, Cognition, and Adaptability to the COVID-19 Pandemic: Associations with Loneliness, Distress, and Positive and Negative Mood States. *International Journal of Mental Health and Addiction*, 20(2), Article 2. <https://doi.org/10.1007/s11469-020-00421-x>
- Bintaş-Zörer, P., & Dirik, G. (2023). Social Anxiety from an Attachment Theory Perspective: The Mediating Role of Early Maladaptive Schema Domains and Rejection Sensitivity. *Journal of Evidence-Based Psychotherapies*, 23(2), 25–47. <https://doi.org/10.24193/jebp.2023.2.9>
- Bridges, K. R., & Harnish, R. J. (2010). Role of irrational beliefs in depression and anxiety: A review. *Health*, 02(08), Article 08. <https://doi.org/10.4236/>

health.2010.28130

- Bonner, R. L., & Rich, A. R. (1987). Toward a Predictive Model of Suicidal Ideation and Behavior: Some Preliminary Data in College Students. *Suicide and Life-Threatening Behavior*, 17(1), Article 1.
<https://doi.org/10.1111/j.1943-278X.1987.tb00061.x>
- Bonner, R. L., & Rich, A. R. (1990). Psychosocial vulnerability, life stress, and suicide ideation in a jail population: A cross-validation study. *Suicide & Life-Threatening Behavior*, 20(3), Article 3.
- Bonner, R. L., & Rich, A. R. (1991). Predicting Vulnerability to Hopelessness: A Longitudinal Analysis. *The Journal of Nervous and Mental Disease*, 179(1), Article 1. <https://doi.org/10.1097/00005053-199101000-00006>
- Botter, L., Gerritsen, D. L., & Oude Voshaar, R. C. (2022). Schema Therapy in the Nursing Home Setting: A Case Study of a Cognitively Impaired Patient. *Clinical Case Studies*, 21(6), 552–570.
<https://doi.org/10.1177/15346501221091790>
- Browne, C. M., Dowd, E. T., & Freeman, A. (2010). Rational and irrational beliefs and psychopathology. In *Rational and irrational beliefs: Research, theory, and clinical practice*. (pp. 149–171). Oxford University Press.
- Cacioppo, J. T., & Hawkley, L. C. (2009). Perceived Social Isolation and Cognition. *Trends in Cognitive Sciences*, 13(10), Article 10.
<https://doi.org/10.1016/j.tics.2009.06.005>
- Chau, A. K. C., So, S. H.-W., Sun, X., Zhu, C., Chiu, C.-D., Chan, R. C. K., & Leung, P. W. L. (2022). The co-occurrence of multidimensional loneliness with depression, social anxiety and paranoia in non-clinical young adults: A latent profile analysis. *Frontiers in Psychiatry*, 13.
<https://doi.org/10.3389/fpsy.2022.931558>
- Cook, W. W., & Medley, D. M. (1954). Proposed hostility and Pharisaic-virtue scales for the MMPI. *Journal of Applied Psychology*, 38(6), 414–418.
<https://doi.org/10.1037/h0060667>
- Costa, P. T., Zonderman, A. B., McCrae, R. R., & Williams, R. B. (1986). Cynicism and paranoid alienation in the Cook and Medley HO Scale. *Psychosomatic Medicine*, 48(3–4), 283–285.
<https://doi.org/10.1097/00006842-198603000-00014>
- David, D. O., DiGiuseppe, R., Dobrea, A., Păsărelu, C. R., & Balazsi, R. (2019). The Measurement of Irrationality and Rationality. In M. E. Bernard & W. Dryden (Eds.), *Advances in REBT* (pp. 79–100). Springer International Publishing. https://doi.org/10.1007/978-3-319-93118-0_4
- De Jong Gierveld, J., & Van Tilburg, T. (2010). The De Jong Gierveld short scales for emotional and social loneliness: Tested on data from 7 countries in the UN generations and gender surveys. *European Journal of Ageing*, 7(2), 121–130.
<https://doi.org/10.1007/s10433-010-0144-6>
- DiTommaso, E., Brannen, C., & Best, L. A. (2004). Measurement and Validity Characteristics of the Short Version of the Social and Emotional Loneliness

- Scale for Adults. *Educational and Psychological Measurement*, 64(1), 99–119. <https://doi.org/10.1177/0013164403258450>
- Döring, N., & Bortz, J. (1993). Psychometrische Einsamkeitsforschung: Deutsche Neukonstruktion der UCLA Loneliness Scale. [Psychometric research on loneliness: A new German version of the University of California at Los Angeles (UCLA) Loneliness Scale.]. *Diagnostica*, 39(3), 224–239.
- Dozois, D. J. A., & Beck, A. T. (2008). Cognitive schemas, beliefs and assumptions. In Risk factors in depression (pp. 121–143). Elsevier Academic Press. <https://doi.org/10.1016/B978-0-08-045078-0.00006-X>
- Ellis, A. (1977). Rational-emotive therapy: Research data that supports the clinical and personality hypotheses of RET and other modes of cognitive-behavior therapy. *The Counseling Psychologist*, 7(1), 2–42. <https://doi.org/10.1177/001100007700700102>
- Ellis, A. (1994). *Reason and Emotion in Psychotherapy. Revised and updated edition*. New York: Birch Lane Press.
- Erzen, E., & Çikrikci, Ö. (2018). The effect of loneliness on depression: A meta-analysis. *International Journal of Social Psychiatry*, 64(5), Article 5. <https://doi.org/10.1177/0020764018776349>
- Flett, G. L., Burdo, R., & Nepon, T. (2021). Mattering, Insecure Attachment, Rumination, and Self-Criticism in Distress Among University Students. *International Journal of Mental Health and Addiction*, 19(4), Article 4. <https://doi.org/10.1007/s11469-020-00225-z>
- Fowler, D., Freeman, D., Smith, B., Kuipers, E., Bebbington, P., Bashforth, H., Coker, S., Hodgekins, J., Gracie, A., Dunn, G., & Garety, P. (2006). The Brief Core Schema Scales (BCSS): Psychometric properties and associations with paranoia and grandiosity in non-clinical and psychosis samples. *Psychological Medicine*, 36(6), 749–759. <https://doi.org/10.1017/S0033291706007355>
- Halamandaris, K. F., & Power, K. G. (1997). Individual differences, dysfunctional attitudes, and social support: A study of the psychosocial adjustment to university life of home students. *Personality and Individual Differences*, 22(1), Article 1. [https://doi.org/10.1016/S0191-8869\(96\)00175-4](https://doi.org/10.1016/S0191-8869(96)00175-4)
- Hawkey, L. C., & Cacioppo, J. T. (2010). Loneliness Matters: A Theoretical and Empirical Review of Consequences and Mechanisms. *Annals of Behavioral Medicine*, 40(2), Article 2. <https://doi.org/10.1007/s12160-010-9210-8>
- Hays, R. D., & DiMatteo, M. R. (1987). A Short-Form Measure of Loneliness. *Journal of Personality Assessment*, 51(1), Article 1. https://doi.org/10.1207/s15327752jpa5101_6
- Heinrich, L. M., & Gullone, E. (2006). The clinical significance of loneliness: A literature review. *Clinical Psychology Review*, 26(6), Article 6. <https://doi.org/10.1016/j.cpr.2006.04.002>
- Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., Ballard, C., Christensen, H., Cohen Silver, R., Everall, I., Ford, T., John, A., Kabir, T., King, K., Madan, I., Michie, S., Przybylski, A. K., Shafran, R.,

- Sweeney, A., ... Bullmore, E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet. Psychiatry*, 7(6), 547–560. [https://doi.org/10.1016/S2215-0366\(20\)30168-1](https://doi.org/10.1016/S2215-0366(20)30168-1)
- Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science*, 10(2), 227–237. <https://doi.org/10.1177/1745691614568352>
- Hughes, M. E., Waite, L. J., Hawkey, L. C., & Cacioppo, J. T. (2004). A Short Scale for Measuring Loneliness in Large Surveys: Results From Two Population-Based Studies. *Research on Aging*, 26(6), Article 6. <https://doi.org/10.1177/0164027504268574>
- Hyland, P., Fox, R., Treacy, G., Maguire, P., Boduszek, D., & Vallières, F. (2017). Assessing the Factorial Validity of the Attitudes and Belief Scale 2-Abbreviated Version: A Call for the Development a Gold Standard Method of Measuring Rational and Irrational Beliefs. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 35(2), Article 2. <https://doi.org/10.1007/s10942-016-0243-1>
- Hyland, P., McGinty, G., Karatzias, T., Murphy, J., Vallières, F., & McHugh Power, J. (2019). Can the REBT theory explain loneliness? Theoretical and clinical applications. *Cognitive Behaviour Therapy*, 48(1), Article 1. <https://doi.org/10.1080/16506073.2018.1475505>
- Ingram, R. E., Kendall, P. C., Siegle, G., Guarino, J., & McLaughlin, S. C. (1995). Psychometric properties of the Positive Automatic Thoughts Questionnaire. *Psychological Assessment*, 7(4), Article 4. <https://doi.org/10.1037/1040-3590.7.4.495>
- Jalilian, K., Momeni, K., & Jebraeili, H. (2023). The mediating role of early maladaptive schemas in the relationship between attachment styles and loneliness. *BMC Psychology*, 11(1), 136. <https://doi.org/10.1186/s40359-023-01172-9>
- Janovsky, T., Rock, A. J., Thorsteinsson, E. B., Clark, G. I., & Murray, C. V. (2020). The relationship between early maladaptive schemas and interpersonal problems: A meta-analytic review. *Clinical Psychology & Psychotherapy*, 27(3), 408–447. <https://doi.org/10.1002/cpp.2439>
- Jarvis, M. A., Padmanabhanunni, A., & Chipps, J. (2019). An Evaluation of a Low-Intensity Cognitive Behavioral Therapy mHealth-Supported Intervention to Reduce Loneliness in Older People. *International Journal of Environmental Research and Public Health*, 16(7), 1305. <https://doi.org/10.3390/ijerph16071305>
- Jeong, Y., & Kim, S. H. (2021). Modification of socioemotional processing in loneliness through feedback-based interpretation training. *Computers in Human Behavior*, 117, 106668. <https://doi.org/10.1016/j.chb.2020.106668>

- Lamster, F., Lincoln, T. M., Nittel, C. M., Rief, W., & Mehl, S. (2017). The lonely road to paranoia. A path-analytic investigation of loneliness and paranoia. *Comprehensive Psychiatry*, 74, 35–43. <https://doi.org/10.1016/j.comppsy.2016.12.007>
- Leahy, R. L. (2002). A model of emotional schemas. *Cognitive and Behavioral Practice*, 9(3), 177–190. [https://doi.org/10.1016/S1077-7229\(02\)80048-7](https://doi.org/10.1016/S1077-7229(02)80048-7)
- Leonova, I. M., Kiz, O. B., Dobrovolska, N. A., Chyzhyk, K. O., & Hovorun, T. V. (2021). Cognitive Models of Loneliness in Women in Early and Middle Adulthood. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(4), Article 4.
- Loades, M. E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., ... & Crawley, E. (2020). Rapid systematic review: the impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *Journal of the American Academy of Child & Adolescent Psychiatry*, 59(11), 1218-1239. <https://doi.org/10.1016/j.jaac.2020.05.009>
- Lobbestael, J., Arntz, A., & Bernstein, D. P. (2010). Disentangling the Relationship Between Different Types of Childhood Maltreatment and Personality Disorders. *Journal of Personality Disorders*, 24(3), Article 3. <https://doi.org/10.1521/pedi.2010.24.3.285>
- Maes, M., Nelemans, S. A., Danneel, S., Fernández-Castilla, B., Van den Noortgate, W., Goossens, L., & Vanhalst, J. (2019). Loneliness and social anxiety across childhood and adolescence: Multilevel meta-analyses of cross-sectional and longitudinal associations. *Developmental Psychology*, 55(7), 1548–1565. <https://doi.org/10.1037/dev0000719>
- Masi, C. M., Chen, H.-Y., Hawkey, L. C., & Cacioppo, J. T. (2011). A meta-analysis of interventions to reduce loneliness. *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc*, 15(3), 219–266. <https://doi.org/10.1177/1088868310377394>
- Moghadam, F., Davarinia, A., & Shomia, S. (2018). The Role of Mother’s Early Maladaptive Schema in Predicting Early Maladaptive Schemas and Loneliness of Children Aged 8 to 15 Years in Amol City, Iran. *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH*, 12. <https://doi.org/10.7860/JCDR/2018/36369.12072>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7), e1000097. <https://doi.org/10.1371/journal.pmed.1000097>
- Netemeyer, R., Williamson, D., Burton, S., Biswas, D., Jindal, S., Grau, S., Mills, G., & Premeaux, S. (2002). Psychometric Properties of Shortened Versions of the Automatic Thoughts Questionnaire. *Educational and Psychological Measurement - EDUC PSYCHOL MEAS*, 62, 111–129. <https://doi.org/10.1177/0013164402062001008>

- Nicol, A., Mak, A. S., Murray, K., Walker, I., & Buckmaster, D. (2020). The relationships between early maladaptive schemas and youth mental health: A systematic review. *Cognitive Therapy and Research*, 44(4), 715–751. <https://doi.org/10.1007/s10608-020-10092-6>
- Nordahl, H. M., & Nysaeter, T. E. (2005). Schema therapy for patients with borderline personality disorder: A single case series. *Journal of Behavior Therapy and Experimental Psychiatry*, 36(3), 254–264. <https://doi.org/10.1016/j.jbtep.2005.05.007>
- Ong, A. D., Uchino, B. N., & Wethington, E. (2015). Loneliness and Health in Older Adults: A Mini-Review and Synthesis. *Gerontology*, 62(4), Article 4. <https://doi.org/10.1159/000441651>
- Peplau, L. A., & Perlman, D. (1982). Loneliness: A sourcebook of current theory, research, and therapy. *Journal of Psychosocial Nursing and Mental Health Services*, 22(6), pp. 40–41
- Preece, D. A., Goldenberg, A., Becerra, R., Boyes, M., Hasking, P., & Gross, J. J. (2021). Loneliness and emotion regulation. *Personality and Individual Differences*, 180. <https://doi.org/10.1016/j.paid.2021.110974>
- Qualter, P., Vanhalst, J., Harris, R., Van Roekel, E., Lodder, G., Bangee, M., Maes, M., & Verhagen, M. (2015). Loneliness Across the Life Span. *Perspectives on Psychological Science*, 10(2), Article 2. <https://doi.org/10.1177/1745691615568999>
- Reinhard, M. A., Popov, N., Rek, S. V., Nenov-Matt, T., Barton, B. B., Jobst, A., Musil, R., & Padberg, F. (2022). Loneliness is associated with maladaptive schema modes in patients with persistent depressive disorder. *Journal of Psychiatric Research*, 154, 56–60. <https://doi.org/10.1016/j.jpsychires.2022.07.057>
- Reiss, N., Dominiak, P., Harris, D., Knörschild, C., Schouten, E., & Jacob, G. A. (2012). Reliability and validity of the German version of the Schema Mode Inventory. *European Journal of Psychological Assessment*, 28(4), 297–304. <https://doi.org/10.1027/1015-5759/a000110>
- Rijkeboer, M. M., van den Bergh, H., & van den Bout, J. (2005). Stability and discriminative power of the Young Schema-Questionnaire in a Dutch clinical versus non-clinical population. *Journal of Behavior Therapy and Experimental Psychiatry*, 36(2), 129–144. <https://doi.org/10.1016/j.jbtep.2004.08.005>
- Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, 39(3), Article 3. <https://doi.org/10.1037/0022-3514.39.3.472>
- Russell, D., Peplau, L. A., & Ferguson, M. L. (1978). Developing a Measure of Loneliness. *Journal of Personality Assessment*, 42(3), Article 3. https://doi.org/10.1207/s15327752jpa4203_11
- Russell, D. W. (1996). UCLA Loneliness Scale (Version 3): Reliability, Validity, and Factor Structure. *Journal of Personality Assessment*, 66(1), Article 1.

- https://doi.org/10.1207/s15327752jpa6601_2
- Segel-Karpas, D., & Ermer, A. (2021). Cynical Hostility and Loneliness in Older Adult Married Couples: An Indirect Effect Through Friendships. *The Journals of Gerontology: Series B*, 76(2), 306–316. <https://doi.org/10.1093/geronb/gbaa170>
- Segel-Karpas, D., & Ayalon, L. (2020). Loneliness and hostility in older adults: A cross-lagged model. *Psychology and Aging*, 35(2), 169–176. <https://doi.org/10.1037/pag0000417>
- Serin, E. K., Durmaz, Y. Ç., & Polat, H. T. (2019). Correlation between smartphone addiction and dysfunctional attitudes in nursing/midwifery students. *Perspectives in Psychiatric Care*, 55(4), 703–709. <https://doi.org/10.1111/ppc.12406>
- Shareh, H., Bakhshandeh Sajjad, A., Hamedani, A., & Rajabi Gol, B. (2022). Relationship between personality traits and emotional schema with loneliness in Iranian people with gender dysphoria: The mediating role of mindfulness. *Sexual and Relationship Therapy*, 0(0), 1–14. <https://doi.org/10.1080/14681994.2022.2139822>
- Shevlin, M., McElroy, E., & Murphy, J. (2015). Loneliness mediates the relationship between childhood trauma and adult psychopathology: Evidence from the adult psychiatric morbidity survey. *Social Psychiatry and Psychiatric Epidemiology*, 50(4), Article 4. <https://doi.org/10.1007/s00127-014-0951-8>
- Shorkey, C. T., & Whiteman, V. L. (1977). Development of the Rational Behavior Inventory: Initial Validity and Reliability. *Educational and Psychological Measurement*, 37(2), Article 2. <https://doi.org/10.1177/001316447703700232>
- Smith, T. W., Glazer, K., Ruiz, J. M., & Gallo, L. C. (2004). Hostility, anger, aggressiveness, and coronary heart disease: An interpersonal perspective on personality, emotion, and health. *Journal of Personality*, 72(6), 1217–1270. <https://doi.org/10.1111/j.1467-6494.2004.00296.x>
- Spithoven, A. W. M., Bijttebier, P., & Goossens, L. (2017). It is all in their mind: A review on information processing bias in lonely individuals. *Clinical Psychology Review*, 58, 97–114. <https://doi.org/10.1016/j.cpr.2017.10.003>
- Surkalim, D. L., Luo, M., Eres, R., Gebel, K., Van Buskirk, J., Bauman, A., & Ding, D. (2022). The prevalence of loneliness across 113 countries: Systematic review and meta-analysis. *BMJ*, e067068. <https://doi.org/10.1136/bmj-2021-067068>
- Tan, A. J., Mancini, V., Gross, J. J., Goldenberg, A., Badcock, J. C., Lim, M. H., Becerra, R., Jackson, B., & Preece, D. A. (2022). Loneliness Versus Distress: A Comparison of Emotion Regulation Profiles. *Behaviour Change*, 39(3), 180–190. <https://doi.org/10.1017/bec.2022.18>
- Thimm, J. C., & Chang, M. (2022). Early Maladaptive Schemas and Mental Disorders in Adulthood: A Systematic Review and Meta-analysis. *International Journal of Cognitive Therapy*, 15(4), 371–413. <https://doi.org/10.1007/s41811-022-00149-7>
- Thyer, B. A., Papsdorf, J. D., Himle, D., & Bray, H. (1981). Normative Data of the Rational Behavior Inventory: A Further Study. *Educational and Psychological*

- Measurement, 41(3), 757–760. <https://doi.org/10.1177/001316448104100314>
- Tomoiață, C., Gheorghiu, R., & David, O. A. (2024). USABILITY OF AN ECOLOGICAL MOMENTARY ASSESSMENT APP FOR MOOD EVALUATION IN YOUNG ADULTS - THE MOODWHEEL APP. *Journal of Evidence-Based Psychotherapies* <https://doi.org/10.24193/jebp.2024.1.8>
- Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., & Johnson, S. (2018). Associations between loneliness and perceived social support and outcomes of mental health problems: A systematic review. *BMC Psychiatry*, 18(1), 156. <https://doi.org/10.1186/s12888-018-1736-5>
- Weiss, R. (1975). *Loneliness: The Experience of Emotional and Social Isolation* (New edition). The MIT Press.
- Weissman, A. N. (1980). Assessing depressogenic attitudes: A validation study. In *51st annual meeting of the Eastern Psychological Association, Hartford, CT*.
- Wilbert, J. R., & Rupert, P. A. (1986). Dysfunctional attitudes, loneliness, and depression in college students. *Cognitive Therapy and Research*, 10(1), Article 1. <https://doi.org/10.1007/BF01173384>
- Young, J. E., Klosko, J. S., & Weishaar, M. E. (2003). *Schema Therapy: A Practitioner's Guide*. Guilford Press.
- Young, J., & Brown, G. (1998). *Schema Questionnaire Short Form*. New York: Cognitive Therapy Center.
- Young, J. E. (1981). *Young loneliness inventories*. Unpublished manuscript, University of Pennsylvania