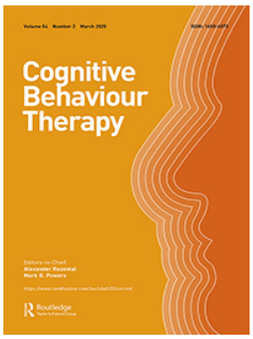

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Theoretic principles of rational emotive behavior therapy (REBT) and loneliness: a multinational replication of Hyland et al. (2019)

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ABSTRACT

Loneliness has detrimental effects on physical and mental well-being, making relevant any systematic means of inhibiting its impact. Whereas interventions based on cognitive behavior therapies have shown efficacy, interventions based on Ellis's rational emotive behavior therapy (REBT) have not been systematically assessed. In 2019, Hyland et al. demonstrated that the REBT theoretic principles of psychopathology and psychological health significantly predict loneliness scores, providing an empirical justification for later intervention efforts. The Hyland et al. sample was small, with limited demographic and geographic diversity. This paper replicates the Hyland et al. analyses using a larger ($N = 3{,}064$) sample drawn from the United States, United Kingdom, Canada, Australia, and South Africa. The present results replicate Hyland et al.'s results for both the psychopathology and psychological health models, with minimal variation in model fit from country to country. Implications for the development of an REBT-based intervention to treat loneliness are discussed.

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Loneliness; REBT; replication

Humans are inherently social beings, and the state of their wellness relies on the strength and quality of their social connections. Loneliness, the perceived gap between desired and actual levels of social interaction, can have detrimental effects on individuals' health and welfare. It affects people regardless of their marital or parental status, frequency of contact with friends, involvement in social or religious organizations, or other objective measures of social engagement (Steptoe et al., 2013).

The significance of loneliness for wellness makes relevant any systematic means of inhibiting its impact. In controlled trials, cognitive behavioral therapies have shown efficacy for reducing the effects of loneliness (see Masi et al., 2011). One cognitive behavioral therapy with potential to treat loneliness successfully is rational emotive behavior therapy (REBT). Although its effectiveness has not yet been assessed in controlled trials, recent research by Hyland et al. (2019) documented that its core principles account for significant variance in loneliness. These findings offer foundational support

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for using REBT to reduce loneliness, yet their external validity beyond the Hyland et al. data is undocumented. The present project replicates the Hyland et al. findings using larger, more diverse, and better representative samples, so that the evidentiary basis for employing REBT to address loneliness is fortified.

This paper begins by reviewing the significance of loneliness as a detriment to well-being. A brief review of systematic treatments for loneliness follows, along with an introduction to REBT. The specifics of the Hyland et al. study are then described, and the current project's hypotheses are introduced.

The significance of loneliness

Loneliness is a distressing psychological state that arises when people perceive that their interpersonal relationships do not adequately fulfill their social needs (J. T. Cacioppo et al., 2006). Whereas loneliness can affect individuals of all ages, certain age groups are more susceptible than others, specifically adolescents and young adults (Qualter et al., 2015) and the elderly (Cudjoe et al., 2020). A recent meta-analysis found that worldwide prevalence rates for loneliness range from 9.2% to 14.4% for adolescents and reach up to 24.2% for adults (Surkalim et al., 2022).

Whereas episodic loneliness affects people at particular points in life (such as during a move to a new city; Hawkley & Cacioppo, 2010), much discussion of loneliness has conceptualized it as a trait characterized by chronic thoughts, feelings, and perceptions related to social isolation (J. T. Cacioppo & Cacioppo, 2018). Lonely individuals are more stressed (Richardson et al., 2017), more depressed (Alpass & Neville, 2003), and less psychologically resilient (Gerino et al., 2017) than their non-lonely counterparts. Lonely individuals also experience increased pain (Jaremka et al., 2013), impaired sleep (Matthews et al., 2017), and increased risks of coronary heart disease (Thurston & Kubzansky, 2009), cardiovascular disease (Paul et al., 2021), and later-life dementia (Wilson et al., 2007). Importantly, loneliness is also a major risk factor for both suicide ideation (Goldsmith et al., 2002) and attempted suicide (Stickley & Koyanagi, 2016), and a predictor of all-cause mortality (Holt-Lunstad et al., 2015; Luo et al., 2012). Understandably, loneliness has been declared a public health crisis both in the United States (Gerst-Emerson & Jayawardhana, 2015; National Academies of Sciences, Engineering, and Medicine, 2020) and elsewhere in the world (Dahl, 2020; DiJulio et al., 2018).

Interventions for loneliness

Although loneliness is not a recognized psychopathology, multiple interventions have been developed and tested to reduce it. A 2011 meta-analysis of interventions tested between 1970 and 2009 identified four primary intervention forms (Masi et al., 2011). Some were designed to increase opportunity for social contact between people, based on the principle that loneliness represents a lack of social opportunity. For example, Kraut et al. (1998) made a personal computer, telephone line, and internet access available to families in their study to facilitate social contact. Other interventions fortified social support, such as through buddy-care or mentoring programs, based on a conceptualization of loneliness as stemming from inadequate support structures. Stewart et al. (2001) facilitated peer-led

support groups of five to nine seniors who met weekly for 20 weeks. The sessions, led by both a professional facilitator and a peer co-leader, emphasized supportive discussions on participant-nominated topics and on existing self-help and supportive resources for seniors. Still other interventions focused on improving social skills, based on the idea that lonely people are deficient in the skills necessary to form and maintain adequate relationships. Allen-Kosal (2008) offered schoolchildren cooperative behavior training and cooperative learning opportunities during an eight-week intervention. The final category represented interventions addressing maladaptive social cognitions, such as through cognitive behavioral therapies, based on the theory that loneliness is exacerbated by dysfunctional social cognitions. For instance, Sorenson's (2003) intervention comprised five 4-hour cognitive behavioral therapy group sessions.

All four intervention types show efficacy, but Masi et al. found that those targeting maladaptive social cognitions demonstrated the most robust effect size (mean = –.598). A later review by S. Cacioppo et al. (2015) reaffirmed the efficacy of targeting dysfunctional social cognitions to decrease feelings of loneliness (see also McWhirter, 1990). A 2021 meta-analysis verified that psychological interventions aimed at reducing loneliness are effective ($g = 0.43$) not just for particular age groups, but across the lifespan (Hickin et al., 2021).

Rational emotive behavior therapy (REBT)

One type of cognitive behavioral therapy with the potential to be effective in reducing loneliness by targeting maladaptive social cognitions is REBT, developed by Ellis (1958, 2005). REBT identifies dysfunctional and self-defeating beliefs, challenges the utility of those beliefs, and replaces them with more functional alternatives.

REBT draws a sharp distinction between rational and irrational beliefs. In everyday use, the term "rational" describes something that is logical and based on reason, whereas something is "irrational" if it is unreasonable or illogical. REBT defines these terms with respect to their practical outcomes. According to Dryden (1984), the term "rational" as used in REBT denotes "that which helps people to achieve their basic goals and purposes, whereas 'irrational' means that which prevents them from achieving those goals and purposes" (p. 238). Thus, a client's belief may be grounded in logic or reason yet still be considered irrational if it inhibits the person's goal achievements.

Although Ellis (1962) originally articulated 11 forms of irrational belief that were instrumental in the development of disturbance, contemporary REBT recognizes four: (1a) *demandingness*, the belief that one must achieve what it is important to achieve and that failing to do so is unacceptable; (2a) *catastrophizing*, the belief that it is awful if one does not have what one wants; (3a) *low frustration tolerance*, the belief that discomfort is intolerable; and (4a) *depreciation*, the belief that one is worthless, unlikable, or bad. These irrational beliefs exist in tandem with their rational versions: (1b) *preference* for what one wants to achieve instead of the demand to achieve it; (2b) *non-catastrophizing*, the recognition that disappointing outcomes are not catastrophic; (3b) *high frustration tolerance*, the ability to tolerate discomfort; and (4b) *acceptance* of the self as a good and worthwhile person. A major task in therapy using REBT is to identify irrational beliefs and replace them with their rational counterparts (Ellis & Ellis, 2019).

To date, no controlled trials of cognitive behavioral interventions for loneliness have, to our knowledge, been explicitly grounded in REBT. Such interventions would be warranted if the REBT principles of psychopathology (demandingness, catastrophizing, low frustration tolerance, and depreciation) and psychological health (preference, non-catastrophizing, high frustration tolerance, and acceptance) account for variance in loneliness. The Hyland et al. (2019) study, described subsequently, investigated whether they do.

The Hyland et al. (2019) Study

Hyland and colleagues tested the efficacy of the REBT models of psychopathology and psychological health to account for variance in loneliness using an opportunistic sample of 397 undergraduates from England, Northern Ireland, and the Republic of Ireland. The authors measured students' loneliness and their endorsement of REBT-identified rational beliefs (preferences, non-catastrophizing, high frustration tolerance, self-acceptance) and irrational beliefs (demandingness, catastrophizing, low frustration tolerance, self-downing). Using structural equation modeling (SEM), the authors found support for the REBT psychopathology model of loneliness and psychological health model of loneliness.

These findings are instrumental in demonstrating theoretically derived correlational associations between REBT principles and loneliness. As such, they lend support to future interventions based on REBT to reduce loneliness. That said, the Hyland et al. (2019) study is based on a small sample that is limited demographically and geographically. All participants were undergraduates at one of four universities in the United Kingdom or Ireland. Most lived in urban or suburban environments, the vast majority (82%) were unmarried, and the average age was 23.33 years. These sampling limitations are not uncommon in social science research, but they do impair claims of external validity. If REBT is to be used as a therapeutic basis for effective loneliness interventions, more extensive evidence of its efficacy would be beneficial.

The current study

The current study replicates the analyses conducted by Hyland et al. (2019) using samples that (a) are larger, affording greater statistical power; (b) represent a more diverse collection of nations and continents; and (c) are either nationally representative or at least gender balanced. Toward those ends, we selected five countries representing four continents in which to collect data: the United States, the United Kingdom, Canada, Australia, and South Africa. These countries were selected because they represent the five English-speaking countries with the highest average loneliness scores (Statista, 2023).

Using data from each country, we tested the same hypotheses proposed by Hyland et al. (2019), shown in Figures 1 and 2:

H1: The REBT model of psychopathology significantly explains observed variance in loneliness.

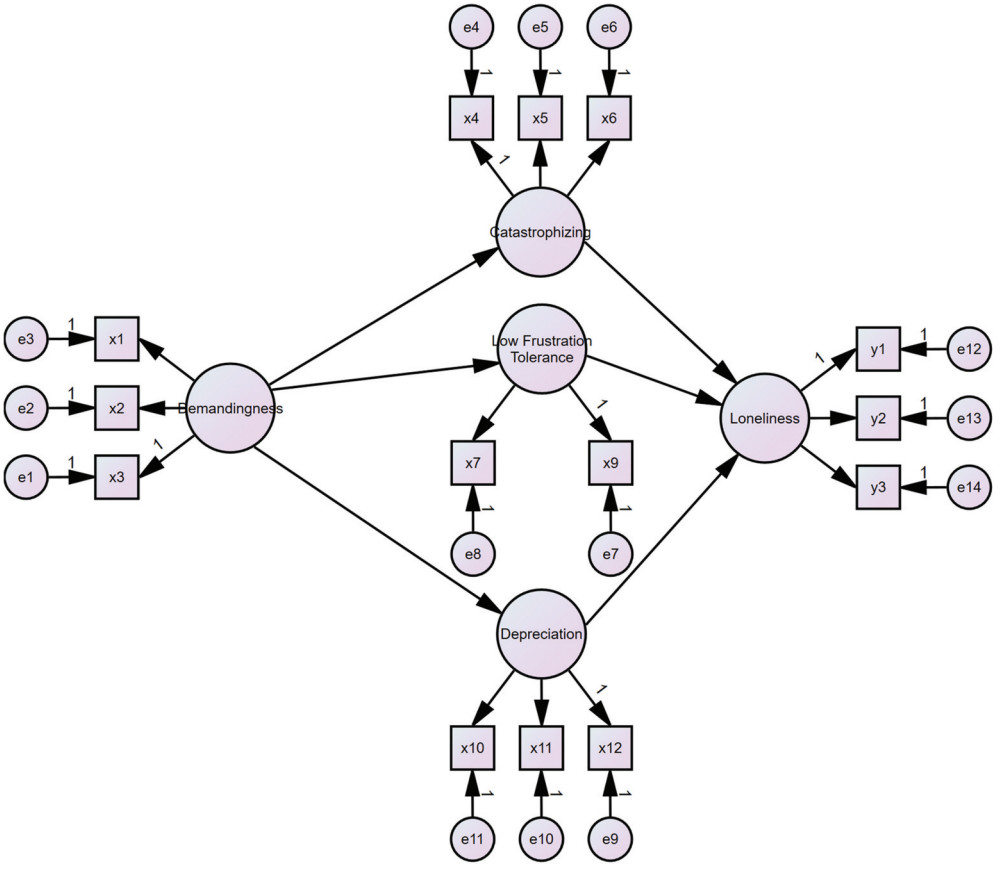

Figure 1. Psychopathology model. The one indicator for low frustration tolerance was removed during the measurement model tests. Final model tests also included covariances between catastrophizing, low frustration tolerance, and depreciation. R^2 values are .22 for catastrophizing, .13 for low frustration tolerance, .06 for depreciation, and .25 for loneliness.

H2: The REBT model of psychological health significantly explains observed variance in loneliness.

Our aim was to verify—with larger, more diverse, and better-representative samples—Hyland et al.'s (2019) demonstration of the utility of the REBT models of psychopathology and psychological health for understanding (and eventually for reducing) loneliness. Given the multinational approach we employed with data collection, we also ascertained whether the country of origin made a difference in the replication:

RQ1: How, if at all, does the country of origin matter with respect to the variance accounted for in loneliness by the REBT models of psychopathology and psychological health?[1]

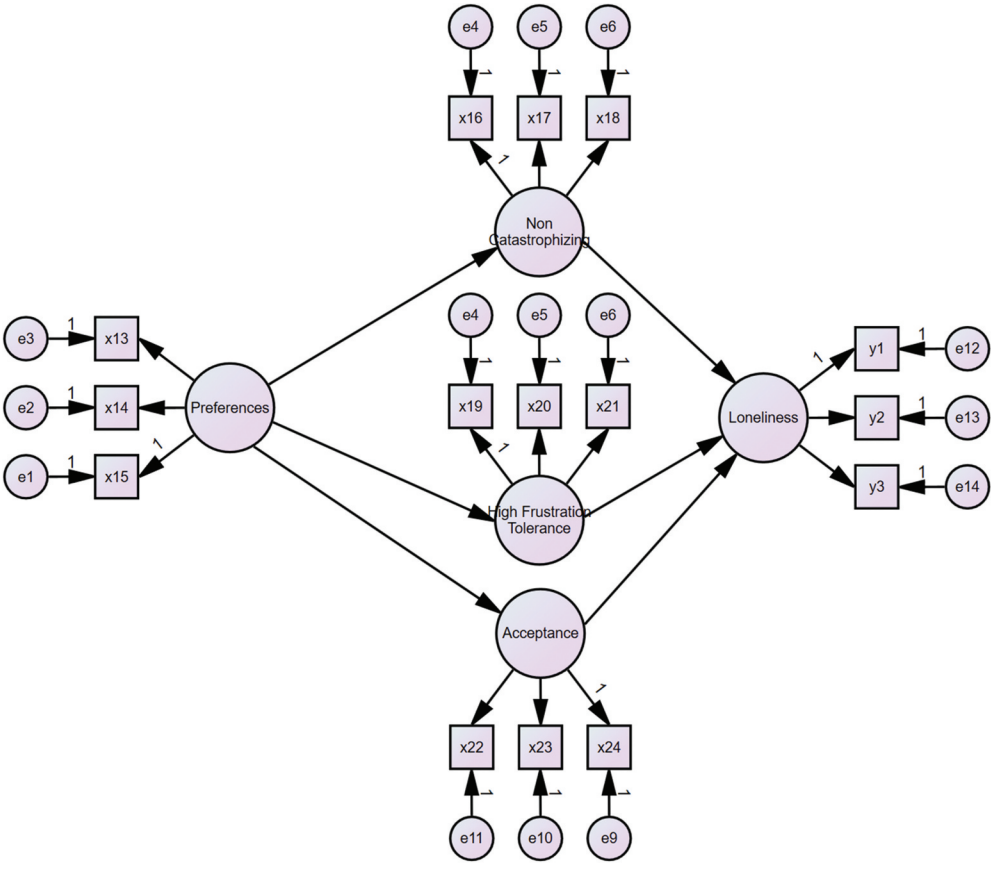

Figure 2. Psychological health model. Final model tests also included covariances between non-catastrophizing, high frustration tolerance, and acceptance. R^2 values are .44 for non-catastrophizing, .44 for high frustration tolerance, .24 for acceptance, and .20 for loneliness.

Method

Participants

Participants were recruited from the United States, the United Kingdom, Australia, Canada, and South Africa ($N = 3{,}064$). Demographic information appears in Table 1. Samples for the United States and United Kingdom were nationally representative, based on census data for sex, ethnicity, and age, whereas the samples for Australia, Canada, and South Africa were gender balanced. Additional data regarding attrition rates, as well as race/ethnicity data for each country, appear in Supplement 1.[2]

Procedure

All procedures were approved by an institutional review board and the study was preregistered with Open Science Framework on 22 May 2023.[3] An *a priori* power analysis indicated that individual sample sizes ≥472 would provide 90% power to detect a small-to-medium (0.2) effect size at a .05 probability level, using structural equation modeling

Table 1. Demographic variables, separated by nation.

Variable[a]	All Participants ($N = 3,064$)	United States ($n = 765$)	United Kingdom ($n = 771$)	Canada ($n = 523$)	Australia ($n = 517$)	South Africa ($n = 488$)
Age Range (in years)	18–85	18–84	18–85	18–78	18–85	18–64
Age: *M* (*SD*)	37.87 (12.64)	45.87 (16.28)	46.16 (15.89)	34.72 (11.41)	34.73 (12.41)	27.85 (7.23)
Sex[b]						
Female	1,554 (50.7%)	391 (51.1%)	395 (51.2%)	259 (49.5%)	263 (50.9%)	246 (50.4%)
Male	1,492 (48.7%)	366 (47.8%)	374 (48.5%)	261 (49.9%)	251 (48.5%)	240 (49.2%)
Intersex	1 (0.03%)	1 (0.1%)	–	–	–	–
Another gender	3 (0.09%)	–	–	–	1 (0.1%)	2 (0.4%)
Preferred not to answer	12 (0.4%)	6 (0.7%)	1 (0.1%)	3 (0.5%)	2 (0.3%)	–
No Response	2 (0.04%)	1 (0.1%)	1 (0.1%)	–	–	–
Gender Identity						
Woman	49.4%	49.1%	51.2%	48.0%	49.3%	49.2%
Man	48.3%	46.5%	47.7%	48.8%	48.2%	50.2%
Non-binary/Third gender	1.4%	2.2%	0.4%	1.9%	1.7%	0.6%
Transgender woman	0.2%	0.9%	–	–	–	–
Transgender man	0.08%	0.4%	–	–	–	–
Genderqueer	0.04%	–	–	0.2%	–	–
Gender-fluid	0.08%	–	–	0.4%	–	–
Another gender	0.2%	0.4%	0.5%	0.4%	0.2%	–
Preferred not to answer	0.4%	0.5%	0.3%	0.4%	0.6%	–
Relationship Status						
Single/not in a committed relationship	35.5%	36.1%	21.9%	38.9%	38.3%	42.4%
Committed dating relationship	26.1%	15.3%	22.2%	26.8%	26.3%	40.0%
Engaged	2.9%	1.4%	3.1%	2.1%	4.6%	3.3%
Married	29.0%	32.5%	46.1%	28.4%	26.1%	12.1%
Divorced or separated	4.1%	11.1%	4.3%	1.7%	2.7%	0.8%
Widowed	1.4%	2.7%	2.1%	0.4%	1.2%	0.4%
Another relational status/No response	0.6%	0.9%	0.3%	1.7%	0.8%	1.0%
Sexual Orientation						
Straight/heterosexual	83.3%	80.9%	89.4%	79.2%	76.3%	90.7%
Bisexual	7.1%	7.6%	5.1%	7.2%	11.0%	4.6%
Lesbian/Gay	3.7%	4.5%	2.5%	4.7%	4.3%	2.3%
Queer	0.7%	0.4%	0.1%	1.6%	1.2%	0.4%
Pansexual	1.5%	2.4%	0.5%	2.1%	2.2%	0.4%
Asexual	1.6%	2.2%	1.1%	2.1%	2.4%	0.2%
Demisexual	0.6%	0.3%	0.3%	0.8%	1.2%	0.6%
Another sexual orientation/No response	1.4%	1.7%	1.0%	2.3%	1.4%	0.8%

(*Continued*)

Table 1. (Continued).

Variable[a]	All Participants ($N = 3,064$)	United States ($n = 765$)	United Kingdom ($n = 771$)	Canada ($n = 523$)	Australia ($n = 517$)	South Africa ($n = 488$)
Employment Status[c]						
Full-time employment (35+ hours/week)	49.8%	45.6%	46.7%	59.8%	50.5%	46.5%
Part-time employment	20.1%	20.3%	18.8%	19.5%	24.2%	17.6%
Full-time student	12.5%	5.4%	6.4%	10.3%	14.3%	26.2%
Part-time student	3.4%	2.0%	0.5%	1.9%	4.6%	8.2%
Unemployed	9.5%	12.4%	7.1%	9.0%	8.9%	10.0%
Retired/Pensioner	7.1%	13.3%	16.5%	2.7%	2.5%	0.6%
Paid disability	1.7%	2.5%	2.1%	2.1%	1.7%	–
Education						
≤ High school/secondary school diploma	12.5%	12.6%	16.7%	10.2%	6.7%	16.3%
Vocational training/further education	4.5%	2.2%	16.5%	3.7%	–	–
Some college but no degree	6.8%	20.4%	–	13.5%	–	–
Associate's degree	3.7%	11.3%	–	7.1%	–	–
Senior secondary school (Australia only)	–	–	–	–	12.0%	–
Post-secondary national certificates (South Africa only)	–	–	–	–	–	27.0%
Bachelor's degree	42.4%	33.0%	37.8%	45.4%	43.1%	52.8%
Master's or doctoral degree	9.4%	20.4%	18.4%	19.4%	22.8%	3.9%
No response	5.5%	1.0%	10.6%	0.7%	15.4%	–
Household Income (in local currency)	–	$	£	CAD	AUD	R
≤24,999		18.4%	20.9%	11.0%	8.4%	24.0%
25,000–49,999		24.2%	37.0%	14.6%	9.5%	12.1%
50,000–74,999		19.6%	16.9%	18.3%	15.1%	5.3%
75,000–99,999		14.0%	8.4%	17.7%	14.9%	6.4%
≥100,000		21.9%	5.6%	31.8%	41.4%	40.8%
No response		1.9%	11.2%	6.6%	10.7%	11.4%
Location	–	46 U.S. states and the District of Columbia; zero U.S. territories	England, Scotland, Wales, Northern Ireland, and another UK dependency	All 10 provinces; zero of the three territories	All 6 states; 2 of 3 internal territories; zero of the three external territories	All 9 provinces

[a]Percentages may total to greater than 100% due to rounding error; [b]Sex that was assigned on participants' original birth certificates.
[c]Percentages for employment status, in particular, may exceed 100% because participants were allowed to select all options that apply.

and assuming five latent variables and 15 observed variables (Soper, 2023). To ensure adequate recruitment, the researchers contracted Prolific Academic to identify participants from the five countries.

Participants who selected the study on Prolific were redirected to an online survey hosted on Qualtrics. Different versions of the survey were created for each country to allow for appropriate demographic options. All potential participants consented to participate via an informed consent form on the first page. Survey measures are described in the following section and were uniform across all versions. Average time spent on the survey was 10 minutes, 33 seconds ($SD = 377.83$ seconds). Participants were compensated $1.40USD.

Measures

For the sake of replication, we used the same measures as were used by Hyland et al. (2019). *REBT principles* were measured using the 24-item Attitudes and Belief Scale 2-Abbreviated Version (ABS2-AV: Hyland et al., 2014). The measure comprises separate three-item scales assessing four rational beliefs (preferences, non-catastrophizing, high frustration tolerance, self-acceptance) and four irrational beliefs (demandingness, catastrophizing, low frustration tolerance, self-downing). Each belief is scored on a Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*), and scores for each belief are calculated as the sum of the three items measuring that belief.

Loneliness was measured using the three-item Loneliness Scale (ULS-3: Hughes et al., 2004), an abbreviated form of the 20-item UCLA Loneliness Scale-Revised (Russell et al., 1980).[4] Items were measured on a four-point Likert-style scale (1 = *I never feel this way*, 2 = *I rarely feel this way*, 3 = *I sometimes feel this way*, 4 = *I often feel this way*) and an overall score for loneliness was calculated as the sum.

Internal reliability estimates, separated by country, appear in Table 2. Mean comparisons by country on study variables appear in Table 3, and descriptive statistics and zero-order intercorrelations appear in Table 4.

Data analysis

There were three steps involved for the data analysis in the current study. First, we conducted confirmatory factor analysis (CFA) tests on both the loneliness and ABS-AV scales to establish the measurement models. That allowed us to set up two full structural

Table 2. Internal reliability estimates, separated by nation.

Variable	U.S.	U.K.	Canada	S. Africa	Australia
Demandingness	.83	.81	.77	.73	.85
Catastrophizing	.73	.71	.66	.61	.71
Low frustration tolerance	.82	.79	.78	.78	.81
Depreciation	.90	.86	.87	.76	.87
Preferences	.88	.85	.85	.81	.87
Non-catastrophizing	.75	.73	.71	.44	.71
High frustration tolerance	.77	.67	.77	.66	.73
Acceptance	.88	.85	.81	.63	.84
Loneliness	.90	.88	.87	.78	.86

Internal reliability estimates are based on McDonald's omega.

Table 3. Mean comparisons by country of origin ($N = 3{,}064$).

Variable	U.S.	U.K.	Canada	S. Africa	Australia
Demandingness	$10.11\ (2.74)_a$	$10.07\ (2.49)_a$	$10.69\ (2.33)_b$	$11.94\ (2.40)_c$	$10.15\ (2.70)_a$
Catastrophizing	$7.93\ (2.99)_a$	$8.97\ (2.85)_b$	$8.98\ (2.69)_b$	$8.77\ (2.86)_b$	$8.95\ (2.89)_b$
L frustration tolerance	$8.67\ (2.98)_a$	$9.48\ (2.81)_b$	$9.42\ (2.75)_b$	$10.68\ (2.92)_c$	$9.18\ (2.83)_b$
Depreciation	$5.05\ (2.77)_a$	$5.16\ (2.57)_a$	$5.85\ (2.87)_b$	$4.51\ (2.25)_c$	$5.94\ (2.97)_b$
Preferences	$10.27\ (2.83)_a$	$10.70\ (2.48)_b$	$10.10\ (2.64)_a$	$9.41\ (3.03)_c$	$10.37\ (2.68)_a$
Non-catastrophizing	$11.14\ (2.46)_a$	10.91 (2.29)	$10.63\ (2.27)_b$	10.83 (2.29)	10.81 (2.36)
H frustration tolerance	$10.98\ (2.46)_a$	10.59 (2.20)	$10.36\ (2.51)_b$	$11.18\ (2.50)_a$	$10.69\ (2.36)_b$
Acceptance	$12.03\ (2.82)_a$	$11.74\ (2.59)_a$	$11.37\ (2.58)_b$	$12.74\ (2.28)_c$	$11.37\ (2.77)_b$
Loneliness	$7.15\ (2.74)_a$	$6.95\ (2.59)_a$	$7.81\ (2.50)_b$	$7.53\ (2.46)_b$	$7.74\ (2.48)_b$

Standard deviations are in parentheses. Cells in the same row with different subscripts differ significantly from each other ($p < .05$), per Student-Newman-Keuls post-hoc tests.

Table 4. Descriptive statistics and intercorrelations for study variables ($N = 3{,}064$).

Variable	Min	Max	*M*	*SD*	1	2	3	4	5	6	7	8
1. Demandingness	3.00	15.00	10.50	2.63	–							
2. Catastrophizing	3.00	15.00	8.68	2.90	.36*	–						
3. L frustration tolerance	3.00	15.00	9.41	2.93	.47*	.58*	–					
4. Depreciation	3.00	15.00	5.28	2.74	.21*	.49*	.36*	–				
5. Preferences	3.00	15.00	10.23	2.75	−.29*	−.17*	−.26*	−.25*	–			
6. Non-catastrophizing	3.00	15.00	10.89	2.34	−.10*	−.28*	−.27*	−.39*	.51*	–		
7. H frustration tolerance	3.00	15.00	10.76	2.41	−.09*	−.26*	−.29*	−.37*	.52*	.66*	–	
8. Acceptance	3.00	15.00	11.85	2.67	−.06*	−.33*	−.22*	−.61*	.42*	.63*	.58*	–
9. Loneliness	3.00	12.00	7.37	2.60	.14*	.37*	.33*	.38*	−.20*	−.28*	−.26*	−.38*

All variables were measured on a 3–15 scale, except for loneliness, which was measured on a 3–12 scale. In all cases, higher scores reflect greater levels of the variable. *$p < .001$.

models replicating the models conducted by Hyland et al. (2019), thus testing our two hypotheses. In these models, we also followed the Hyland et al. study by conducting a bootstrapping test to test for indirect effects, examining the bias-corrected confidence intervals. Finally, we ran multiple-group analyses on both models to test whether any of the structural weights varied as a result of the country of origin. All tests were conducted in AMOS v29. Consistent with Hyland et al. (2019), we used a critical alpha of .05 as the threshold for significance. We also reported chi-square statistics on our structural models to be consistent with Hyland et al. (2019), even though that statistic is generally statistically significant in samples of this size and was thus not used in the overall assessment of model fit. In terms of assessing excellent model fit, we used the cutoff parameters given by Hu and Bentler (1999), including TLI = .95, CFI =,95, SRMR = .08, and RMSEA = .06. We marked structural models meeting all cutoff parameters as having excellent fit.

Results

Step 1: CFA results

We set up the ABS2 CFA in the same fashion as the Hyland et al. (2019) study, with eight latent factors representing the eight processes in the model. Only one final modification to the model was needed to achieve satisfactory model fit, which was removing one item from the low frustration tolerance scale that was loading onto multiple indicators. After that removal, the final CFA model fit for ABS2 was excellent, $\chi^2 = 1342.48$, $df = 202$, p

< .001, CFI = .97, TLI = .96, SRMR = .05, RMSEA = .04 (95% CI = .04 to .05). All model parameters were positive and statistically significant.

For the loneliness CFA, we again replicated the Hyland et al. (2019) study by constraining the residual variance of items 1 and 2 to be equal to deal with the just-identified model. Model fit was excellent, $\chi^2 = 22.27$, $df = 1$, $p < .001$, CFI = .99, TLI = .99, RMSEA = .06 (95% CI = .04 to .08). All model parameters were positive and statistically significant.

Step 2: structural model results

REBT psychopathology model

After running the initial model, we added relationships between the error terms of the three middle structural variables (catastrophizing, low frustration tolerance, and depreciation) to improve model fit. The final model showed excellent model fit, $\chi^2 = 775.55$, $df = 68$, $p < .001$, CFI = .96, TLI = .95, SRMR = .06, RMSEA = .06 (95% CI = .055 to .063). Demandingness had a positive direct effect on catastrophizing (β = .47, $p < .001$), low frustration tolerance (β = .36, $p < .001$), and depreciation (β = .25, $p < .001$). The three REBT variables of catastrophizing (β = .12, $p = .003$), low frustration tolerance (β = .17, $p < .001$), and depreciation (β = .31, $p < .001$) also directly related to loneliness. Finally, the indirect effects of demandingness on loneliness were significant through all other REBT variables, including catastrophizing (β = .05, 95% CI = .01 to .09, $p = .01$), low frustration tolerance (β = .05, 95% CI = .03 to .07, $p = .004$), and depreciation (β = .06, 95% CI = .05 to .09, $p = .003$).

REBT psychological health model

After running the initial model, once again we added relationships between the error terms of the three middle structural variables (non-catastrophizing, high frustration tolerance, and self-acceptance) to improve model fit. The final model showed excellent model fit, $\chi^2 = 345.60$, $df = 81$, $p < .001$, CFI = .99, TLI = .98, SRMR = .03, RMSEA = .03 (95% CI = .03 to .04). Preferences had a positive direct effect on non-catastrophizing (β = .54, $p < .001$), high frustration tolerance (β = .50, $p < .001$), and self-acceptance (β = .44, $p < .001$). However, only the direct effect between self-acceptance and loneliness was negative and significant, β = −.38, $p < .001$. The direct effects between both high frustration tolerance and non-catastrophizing with loneliness were both nonsignificant. Finally, the indirect effect of preferences on loneliness through self-acceptance was also significant (β = −.17, 95% CI = −.27 to −.07, $p = .03$).

Step 3: group differences

Psychopathology model

To test for differences in the model based on country of origin, we ran a multiple-group analysis in AMOS, constraining the structural weights in the model to be equal. The difference between the fully unconstrained and constrained models was significant, χ^2 difference = 55.58, $df = 24$, $p < .001$. Thus, we examined the individual structural weights to see where the group differences were significant. The structural weights between demandingness and depreciation (χ^2 difference = 32.75, $df = 4$, $p < .001$) and between

low frustration tolerance and loneliness (χ^2 difference = 12.07, $df = 4$, $p = .02$) were the only ones significantly different when constrained. First, the structural weight between demandingness and depreciation was different and statistically significant for the United States (β = .25), the United Kingdom (β = .37), Canada (β = .36), South Africa (β = .36), but the structural weight for Australia was nonsignificant (β = .03, $p = .61$). Next, the structural weight between low frustration tolerance and loneliness was different and statistically significant for the United Kingdom (β = .23), Canada (β = .33), and South Africa (β = .12, $p = .048$), but the structural weight for both the United States (β = .07, $p = .24$) and Australia (β = .12, $p = .17$) was nonsignificant.

Psychological health model

To test for differences in the model based on country of origin, we ran a multiple-group analysis in AMOS, constraining the structural weights in the model to be equal. The difference between the fully unconstrained and constrained models was significant, χ^2 difference = 108.63, $df = 24$, $p < .001$. Thus, we examined the individual structural weights to see where the group differences were significant. The structural weights between preferences and non-catastrophizing (χ^2 difference = 37.70, $df = 4$, $p < .001$), self-acceptance (χ^2 difference = 74.96, $df = 4$, $p < .001$), and high frustration tolerance (χ^2 difference = 25.96, $df = 4$, $p < .001$) were significantly different when constrained, whereas all three structural weights to loneliness were not significantly different when constrained. A scan of the standardized regression weights on those three pathways showed a range of numbers, although all were still statistically significant. First, the structural weight between preferences and noncatastrophizing was different for the United States (β = .61), the United Kingdom (β = .79), Canada (β = .73), South Africa (β = .48), and Australia (β = .72). Second was the structural weight between preferences and self-acceptance for the United States (β = .51), the United Kingdom (β = .64), Canada (β = .56), South Africa (β = .24), and Australia (β = .63). Third was the structural weight between preferences and high frustration tolerance for the United States (β = .69), the United Kingdom (β = .78), Canada (β = .78), South Africa (β = .49), and Australia (β = .74).

Discussion

This study replicated Hyland et al.'s (2019) examination of REBT-derived variables' associations with loneliness. Hyland and colleagues demonstrated efficacy for variables related to psychopathology and psychological health to account for variation in loneliness scores, yet their investigation was limited by a small, homogenous sample. To bolster the external validity of their findings, we used a large sample recruited from five countries on four continents. The sample ($N = 3{,}064$) was considerably larger and more diverse than the original, offering the opportunity to confirm and add external validity to Hyland et al.'s findings.

Our results replicated the earlier investigation's results. With respect to the model of psychopathology, demandingness was significantly related to catastrophizing, low frustration tolerance, and depreciation, and all three of these variables were significantly related to loneliness. This mostly replicated the earlier study, the only difference being the significant pathway between low frustration tolerance and loneliness (and thus the

significant indirect effect as well). With respect to the model of psychological health, preferences were significantly related to non-catastrophizing, high frustration tolerance, and self-acceptance, in accordance with original findings, yet of these variables, only self-acceptance accounted for significant variance in loneliness. The paths from non-catastrophizing and high frustration tolerance to loneliness were nonsignificant, which precisely replicates Hyland et al.'s results.

We also examined whether any pathways in the models differed on account of nationality. Several pathways were significantly different, with a few standing out. In the psychopathology model, the weight from low frustration tolerance to loneliness was nonsignificant for both the United States and Australia (though approaching significance for Australia). In the psychological health model, all weights remained statistically significant, but South Africa had lower beta weights from preferences to the other three variables, most pronounced between preferences and acceptance.

It is possible that the lower beta weights from the South African sample reflect attenuated statistical power attributable to lower internal reliability estimates (see Table 2). Despite the adequate sample size, the suboptimal measurement reliability for some variables (such as acceptance) may have constrained the magnitude of associations with other variables. The reason behind the nonsignificant association between low frustration tolerance and loneliness in the United States and Australia is less evident, given that these variables are significantly correlated in the remaining samples and also in samples from Turkey (Saricali & Guler, 2022) and Iran (Karami et al., 2020). One possibility is that, despite the significant associations between low frustration tolerance and loneliness in the U.K., Canadian, and South African samples, low frustration tolerance in general has a tenuous theoretic link to loneliness. In other words, being intolerant of frustration, in general, may not contribute to loneliness as much as does being intolerant of loneliness-related frustrations (such as the belief that one cannot tolerate the frustration of having few friends or lacking social connection).

Implications

In sum, then, the Hyland et al. findings were replicated with the larger and more diverse sample, indicating that their efficacy is not restricted to the undergraduate sample from the United Kingdom and Ireland on which they were originally tested. The present results warrant two preliminary conclusions. First, they offer stronger support for the model of psychopathology as a basis for improving loneliness; second, however, they suggest that the model of psychological health may be less effective overall at accounting for variance. Both findings are potentially valuable with respect to designing therapeutic interventions for the general population, in direct response to the call from Masi et al. (2011) to do so.

Specifically, these results bolster Hyland and colleagues' observation that irrational beliefs—which, as those authors pointed out, are well known correlates of several common psychopathologies—are significantly associated with feelings of loneliness. For example, loneliness has consistently been tied to impaired cognitions, especially for men (Park et al., 2020); impairs compassion for suffering social groups (Floyd et al., 2022); and has been shown to mediate the relationship between maladaptive thinking and emotional expressivity (Koç & Arslan, 2022). The Hyland study and our study both

provide empirical support for links between irrational beliefs and loneliness. This, in turn, implies that interventions aimed at identifying and challenging irrational beliefs, and replacing them with more functional beliefs (such as replacing the belief that "My loneliness is terrible and I cannot stand it" with the belief that "I do not prefer being lonely but it is not intolerable for me") may have therapeutic efficacy at reducing feelings of loneliness. For example, one study found that irrational beliefs predicted greater COVID-19 anxiety, whereas rational beliefs predicted less COVID-19 anxiety (De Landsheer & Walburg, 2022). Considering the consistent association between anxiety and loneliness, it is likely that replacing irrational beliefs with rational beliefs could address loneliness. Whereas several interventions have been developed based on general principles of cognitive behavioral therapies, an REBT-specific intervention aimed at addressing the irrational beliefs of demandingness, catastrophizing, low frustration tolerance, and depreciation has only been tested once in a small sample of women who experienced REBT in a group counseling setting (Maranata et al., 2019). Whereas the original Hyland et al. findings offered a warrant for developing and testing such an intervention approach, the current findings fortify that warrant substantially.

At the same time, our findings suggest that the model of psychological health may be a somewhat less effective intervention approach than the psychopathology model, although one study has shown that self-acceptance mediates the relationship between REBT in group counseling and reductions in loneliness (Maranata et al., 2019). This aligns with Hyland et al.'s finding that the only variable from the psychological health model to demonstrate a significant association with loneliness was self-acceptance. Likewise, in a meta-analysis of REBT studies, the strongest predictor of reduced psychological distress was unconditional acceptance beliefs (Oltean & David, 2018). Together, these results imply that bolstering acceptance of the self—along with challenging low frustration tolerance, depreciation, and the tendency to catastrophize—may be elements of an effective loneliness intervention.

Strengths and limitations

A substantial strength was the sample. Whereas Hyland et al. used 397 undergraduates from Ireland and the United Kingdom, we replicated the findings with a sample that was considerably larger ($N = 3{,}064$) and more diverse demographically and geographically. As noted, the U.S. and U.K. samples were both census-matched representative samples, and the data represent the five loneliest countries in the English-speaking world, drawn from four continents (Africa, Australia, Europe, and North America). That Hyland et al.'s original results were replicated with a large and diverse sample adds substantial external validity to those results.

Some limitations evident in the original study must also be acknowledged here. First, as was also the case in the Hyland et al. study, a few internal reliability estimates were suboptimal. Although most McDonald's omega values were > .70 (see Table 2), some were < .70 and the non-catastrophizing measure for the South African sample showed poor internal reliability ($\omega = .44$). Second, as Hyland and colleagues pointed out, the ABS2-AV subscales for depreciation and acceptance measure these variables only in relation to the self, rather than also in relation to others. In terms of South African scores, these poor internal reliability scores should be considered when interpreting results. For

example, we would be less confident with our results with non-catastrophizing for the South African sample, and future studies should ensure replication with a more reliable measurement model.

Third, the average loneliness score for our sample was 7.37 on a 3–12 scale, just shy of the theoretic midpoint of 7.50. Per a one-sample *t*-test, our average score of 7.37 differed significantly from the theoretic midpoint of 7.50, t (3,063) = −2.73, p = .006 (two-tailed). Average loneliness in the Hyland et al. study was also low, at 5.36 on the same scale. Hyland and colleagues attributed the low average loneliness score to having used a convenience sample of undergraduates, but it may also be attributable in the current study to having used representative samples from two of the five countries surveyed. That is, in neither study was there a purposive attempt to recruit highly lonely people. This variance in loneliness scores was likely advantageous (relative to a sample whose loneliness scores were negatively skewed), yet neither the Hyland et al. study nor the current study could truly be considered a study of particularly lonely individuals.

Fourth, we relied exclusively on self-report measures. This may have prompted social desirability bias, resulting in participants under-reporting variables with negative connotations. To address this, future studies might include other-reports and behavioral measurements in conjunction with self-report measures. Importantly, other-reports and behavioral measures also have disadvantages, including at times having lower validity than self-report measures (Howard, 1994).

Fifth, the cross-sectional design of the study does not support causal claims. As Hyland et al. pointed out, it is possible that loneliness is a causal factor in the REBT-derived theoretic models, instead of the cognitive variables, particularly if loneliness is conceptualized as a personality trait rather than a situational experience (Shiovitz-Ezra & Ayalon, 2010). Hyland and colleagues observed that REBT theory can account for that possibility and that longitudinal research would be needed to adjudicate the temporal associations between loneliness and functional or dysfunctional cognitions.

Unlike in the Hyland et al. study, the data collection was not strictly a convenience sample, but rather a sample intentionally identified to reflect U.S. and U.K. population demographics and to provide a gender-balanced sample from Canada, South Africa, and Australia. Nonetheless, the sampling frame represented only those individuals registered with Prolific Academic, whose pool of participants exceeds 120,000 people worldwide (Prolific.co, 2023). Online samples are frequently critiqued, including for their representativeness or for the quality of data they produce (Crump et al., 2013). Nonetheless, in a comparison of five online data collection platforms, Douglas et al. (2023) reported that Prolific and CloudResearch (formerly TurkPrime) produced the highest-quality data, in which participants were most likely to pass attention checks, follow instructions, work slowly enough, provide meaningful responses to survey questions, and recall previously provided information, as well as to have a unique geolocation and IP address. Thus, although online data collection is not without limitations, the platform employed in the current study enjoys advantages over alternatives.

Conclusions

Loneliness is a global pandemic, with substantial portions of the world population perceiving the quantity and quality of their relationships as deficient. Hyland et al. found that

maladaptive social cognitions theoretically related to REBT accounted for significant variance in loneliness. Although this was useful to establish, their work occurred within an homogenous convenience sample of undergraduates. Thus, this study replicated the findings from Hyland et al. in more representative samples from the five loneliest English-speaking countries. Our results confirm the findings from Hyland et al. and consequently offer greater credence and external validity to the potential therapeutic use of REBT to reduce loneliness in various populations. Loneliness interventions could be designed based on the foundations of REBT, and tests of such interventions can adjudicate to what extent replacing maladaptive cognitions with corresponding adaptive cognitions can address loneliness.

Notes

1. The research question was not included in preregistration.
2. https://osf.io/rp3av/?view_only=1b831fff6e2d495f889da27dd1040744.
3. https://osf.io/wujmy/?view_only=12dbd59485dd4fb5990d0978ced09c0d.
4. The items are "I feel left out," "I feel isolated," and "I lack companionship".

Disclosure statement

No potential conflict of interest was reported by the author(s).

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References

Allen-Kosal, L. M. (2008). *Cooperative learning and cooperative pre-training: an intervention for loneliness in elementary students* [Unpublished doctoral dissertation]. Central Michigan University.

Alpass, F. M., & Neville, S. (2003). Loneliness, health and depression in older males. *Aging & Mental Health*, *7*(3), 212–216. https://doi.org/10.1080/1360786031000101193

Cacioppo, J. T., & Cacioppo, S. (2018). Loneliness in the modern age: An evolutionary theory of loneliness (ETL). In J. M. Olson (Ed.), *Advances in experimental social psychology* (Vol. 58, pp. 127–197). Elsevier. https://doi.org/10.1016/bs.aesp.2018.03.003

Cacioppo, J. T., Hughes, M. E., Waite, L. J., Hawkley, L. C., & Thisted, R. A. (2006). Loneliness as a specific risk factor for depressive symptoms: Cross-sectional and longitudinal analyses. *Psychology and Aging*, *21*(1), 140–151. https://doi.org/10.1037/0882-7974.21.1.140

Cacioppo, S., Grippo, A. J., London, S., Goossens, L., & Cacioppo, J. T. (2015). Loneliness: Clinical import and interventions. *Perspectives on Psychological Science*, *10*(2), 238–249. https://doi.org/10.1177/1745691615570616

Crump, M. J. C., McDonnell, J. V., Gureckis, T. M., & Gilbert, S. (2013). Evaluating Amazon's Mechanical Turk as a tool for experimental behavioral research. *PLOS ONE*, *8*(3), e57410. https://doi.org/10.1371/journal.pone.0057410

Cudjoe, T. K. M., Roth, D. L., Szanton, S. L., Wolff, J. L., Boyd, C. M., Thorpe, R. J., & Carr, D. (2020). The epidemiology of social isolation: National health and aging trends study. *The Journals of Gerontology: Series B*, *75*(1), 107–113. https://doi.org/10.1093/geronb/gby037

Dahl, N. (2020). Governing through *kodokushi*. Japan's lonely deaths and their impact on community self-government. *Contemporary Japan*, *32*(1), 83–102. https://doi.org/10.1080/18692729.2019.1680512

De Landsheer, C., & Walburg, V. (2022). Links between rational and irrational beliefs, trait anxiety and fear of COVID 19. *Psychologie Française*, *67*(3), 305–316. https://doi.org/10.1016/j.psfr.2022.06.005

DiJulio, B., Hamel, L., Muñana, C., & Brodie, M. (2018). *Loneliness and social isolation in the United States, the United Kingdom, and Japan: An international survey*. The Kaiser Family Foundation. https://files.kff.org/attachment/Report-Loneliness-and-Social-Isolation-in-the-United-States-the-United-Kingdom-and-Japan-An-International-Survey

Douglas, B. D., Ewell, P. J., Brauer, M., & Hallam, J. S. (2023). Data quality in online human-subjects research: Comparisons between MTurk, Prolific, CloudResearch, Qualtrics, and SONA. *PLOS ONE*, *18*(3), e0279720. https://doi.org/10.1371/journal.pone.0279720

Dryden, W. (1984). *Rational-emotive therapy: Fundamentals and innovations*. Routledge. https://doi.org/10.4324/9781315762920

Ellis, A. (1958). Rational psychotherapy. *The Journal of General Psychology*, *59*(1), 35–49. https://doi.org/10.1080/00221309.1958.9710170

Ellis, A. (1962). *Reason and emotion in psychotherapy*. Lyle Stuart.

Ellis, A., & Ellis, D. J. (2019). *Rational emotive behavior therapy* (2nd ed.). American Psychological Association.

Ellis, A., & MacLaren, C. (2005). *Rational emotive behavior therapy: A therapist's guide* (2nd ed.). Impact Publishers.

Floyd, K., Ray, C. D., James, R., & Anderson, A. J. (2022). Correlates of compassion for suffering social groups. *The Southern Communication Journal*, *87*(4), 324–338. https://doi.org/10.1080/1041794X.2022.2086612

Gerino, E., Rollè, L., Sechi, C., & Brustia, P. (2017). Loneliness, resilience, mental health, and quality of life in old age: A structural equation model. *Frontiers in Psychology*, *8*, Article 2003. https://doi.org/10.3389/fpsyg.2017.02003

Gerst-Emerson, K., & Jayawardhana, J. (2015). Loneliness as a public health issue: The impact of loneliness on health care utilization among older adults. *American Journal of Public Health*, *105*(5), 1013–1019. https://doi.org/10.2105/AJPH.2014.302427

Goldsmith, S. K., Pellmar, T. C., Kleinman, A. M., & Bunney, W. E. (Eds.). (2002). *Reducing suicide: A national imperative*. National Academies Press.

Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine*, *40*(2), 218–227. https://doi.org/10.1007/s12160-010-9210-8

Hickin, N., Käll, A., Shafran, R., Sutcliffe, S., Manzotti, G., & Langan, D. (2021). The effectiveness of psychological interventions for loneliness: A systematic review and meta-analysis. *Clinical Psychology Review*, *88*, 102066. https://doi.org/10.1016/j.cpr.2021.102066

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

Howard, G. S. (1994). Why do people say nasty things about self-reports? *Journal of Organizational Behavior*, *15*(5), 399–404. https://doi.org/10.1002/job.4030150505

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hughes, M. E., Waite, L. J., Hawley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys. *Research on Aging*, *26*(6), 655–672. https://doi.org/10.1177/0164027504268574

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), 39–51. https://doi.org/10.1080/16506073.2018.1475505

Hyland, P., Shevlin, M., Adamson, G., & Goduszek, D. (2014). Modelling the structure of the attitudes and belief scale 2: Toward the development of an abbreviated version. *Cognitive Behaviour Therapy*, *43*(1), 60–71. https://doi.org/10.1080/16506073.2013.777467

Jaremka, L. M., Fagundes, C. P., Glaser, R., Bennett, J. M., Malarkey, W. B., & Kiecolt-Glaser, J. K. (2013). Loneliness predicts pain, depression, and fatigue: Understanding the role of immune dysregulation. *Psychoneuroendocrinology*, *38*(8), 1310–1317. https://doi.org/10.1016/j.psyneuen.2012.11.016

Karami, A., Khodarahimi, S., Ghazanfari, F., Mirdrikvand, F., & Barigh, M. (2020). The prediction of distress tolerance based on the feeling of loneliness and self-handicapping in students. *Personality & Individual Differences*, *161*, 109994. https://doi.org/10.1016/j.paid.2020.109994

Koç, H., & Arslan, C. (2022). The mediating role of loneliness in the relationship between maladaptive thinking styles and emotional expressivity. *Psycho-Educational Research Reviews*, *11*(1), 93–107.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *The American Psychologist*, *53*(9), 1017–1031. https://doi.org/10.1037/0033-066X.53.9.1017

Luo, Y., Hawkley, L. C., Waite, L. J., & Cacioppo, J. T. (2012). Loneliness, health, and mortality in old age: A national longitudinal study. *Social Science & Medicine*, *74*(6), 907–914. https://doi.org/10.1016/j.socscimed.2011.11.028

Maranata, P., Wibowo, M. E., & Sugiharto, D. Y. P. (2019). The effectiveness of rational emotive behavior therapy group counseling to reduce loneliness through increasing self-adjustment for new college students. *Jurnal Bimbingan Konseling*, *8*(2), 182–187.

Masi, C. M., Chen, H.-Y., Hawkley, L. C., & Cacioppo, J. T. (2011). A meta-analysis of interventions to reduce loneliness. *Personality and Social Psychology Review*, *15*(3), 219–266. https://doi.org/10.1177/1088868310377394

Matthews, T., Danese, A., Gregory, A. M., Caspi, A., Moffitt, T. E., & Arseneault, L. (2017). Sleeping with one eye open: Loneliness and sleep quality in young adults. *Psychological Medicine*, *47*(12), 2177–2186. https://doi.org/10.1017/S0033291717000629

McWhirter, B. T. (1990). Loneliness: A review of current literature, with implications for counseling and research. *Journal of Counseling & Development*, *68*(4), 417–422. https://doi.org/10.1002/j.1556-6676.1990.tb02521.x

National Academies of Sciences, Engineering, and Medicine. (2020). *Social isolation and loneliness in older adults: Opportunities for the health care system*. Author. https://doi.org/10.17226/25663

Oltean, H. R., & David, D. O. (2018). A meta-analysis of the relationship between rational beliefs and psychological distress. *Journal of Clinical Psychology*, *74*(6), 883–895. https://doi.org/10.1002/jclp.22562

Park, C., Majeed, A., Gill, H., Tamura, J., Ho, R. C., Mansur, R. B., Nasri, F., Lee, Y., Rosenblat, J. D., Wong, E., & McIntyre, R. S. (2020). The effect of loneliness on distinct health outcomes: A comprehensive review and meta-analysis. *Psychiatry Research*, *294*, 113514. https://doi.org/10.1016/j.psychres.2020.113514

Paul, E., Bu, F., & Fancourt, D. (2021). Loneliness and risk for cardiovascular disease: Mechanisms and future directions. *Current Cardiology Reports*, *23*(6), 68. https://doi.org/10.1007/s11886-021-01495-2

Prolific.co. (2023). *Our vetted participant pool*. https://www.prolific.co/#:~:text=Our%20proprietary%20pool%20is%20vetted,engaged%20participants%20at%20any%20time

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), 250–264. https://doi.org/10.1177/1745691615568999

Richardson, T., Elliott, P., & Roberts, R. (2017). Relationship between loneliness and mental health in students. *Journal of Public Mental Health*, *16*(2), 48–54. https://doi.org/10.1108/JPMH-03-2016-0013

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA loneliness scale: Concurrent and discriminant validity evidence. *Journal of Personality & Social Psychology*, *39*(3), 472–480. https://doi.org/10.1037/0022-3514.39.3.472

Saricali, M., & Guler, D. (2022). The mediating role of psychological need frustration on the relationship between frustration intolerance and existential loneliness. *Current Psychology*, *41* (8), 5603–5611. https://doi.org/10.1007/s12144-022-02866-w

Shiovitz-Ezra, S., & Ayalon, L. (2010). Situational versus chronic loneliness as risk factors for all-cause mortality. *International Psychogeriatrics*, *22*(3), 455–462. https://doi.org/10.1017/S1041610209991426

Soper, D. (2023). *Calculator: A-priori sample size for structural equation models*. https://www.danielsoper.com/statcalc/calculator.aspx?id=89

Sorenson, D. S. (2003). Healing traumatizing provider interactions among women through short-term group therapy. *Archives of Psychiatric Nursing*, *17*(6), 259–269. https://doi.org/10.1053/j.apnu.2003.10.002

Statista. (2023). *Feeling of loneliness among adults 2021, by country*. https://www.statista.com/statistics/1222815/loneliness-among-adults-by-country/

Steptoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*, *110*(15), 5797–5801. https://doi.org/10.1073/pnas.1219686110

Stewart, M., Craig, D., MacPherson, K., & Alexander, S. (2001). Promoting positive affect and diminishing loneliness of widowed seniors through support interventions. *Public Health Nursing*, *18*(1), 54–63. https://doi.org/10.1046/j.1525-1446.2001.00054.x

Stickley, A., & Koyanagi, A. (2016). Loneliness, common mental disorders and suicidal behavior: Findings from a general population survey. *Journal of Affective Disorders*, *197*, 81–87. https://doi.org/10.1016/j.jad.2016.02.054

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. *The British Medical Journal*, *376*, e067068. https://doi.org/10.1136/bmj-2021-067068

Thurston, R. C., & Kubzansky, L. D. (2009). Women, loneliness, and incident coronary heart disease. *Psychosomatic Medicine*, *71*(8), 836–842. https://doi.org/10.1097/PSY.0b013e3181b40efc

Wilson, R. S., Krueger, K. R., Arnold, S. E., Schneider, J. A., Kelly, J. F., Barnes, L. L., Tang, Y., & Bennett, D. A. (2007). Loneliness and risk of Alzheimer disease. *Archives of General Psychiatry*, *64*(2), 234–240. https://doi.org/10.1001/archpsyc.64.2.234