Minding the gap: Subjective relative deprivation and depressive symptoms

Shadi Beshai [a], [*], Sandeep Mishra [a], Tyler J.S. Meadows [a], Priya Parmar [a], Vivian Huang [b]

[a] University of Regina, Canada
[b] Ryerson University, Canada

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ABSTRACT

Substantial evidence has linked depressive symptoms to various indices of societal-level inequality and relative deprivation. A larger literature has also addressed cognitive vulnerability and correlates of depression. Despite this evidence, little research to date has examined the relationship of depressive symptoms with such downstream individual-level consequences of inequality as subjective relative deprivation, or whether relative deprivation is associated with cognitive vulnerability in depression. We conducted two investigations among four separate samples (total $N = 2999$) to examine associations between subjective relative deprivation and depressive symptoms and cognitions. Across our studies and four different self-report measures of depressive symptoms, we found consistent significant positive associations between subjective relative deprivation and depression symptoms. Further, we found that subjective relative deprivation was predictive of depressive symptoms over and above other known vulnerability factors. Finally, we found that the relationship between subjective relative deprivation and depressive symptoms was fully mediated by negative automatic thoughts about self. These results provide further evidence of the importance of subjective deprivation in maintaining negative mental health outcomes.

1. Introduction

Depression is a prevalent and chronic mental health condition (Kessler et al., 2003). The lifetime prevalence of depression is estimated at 10% in most countries, and may be as high as 20% in the United States (Kessler and Bromet, 2013). Beyond individual-level mental health consequences, depression has substantial economic costs in the range of billions of dollars per year (Üstün et al., 2004). Despite the consensus that depression is a complex product of biological, social, and psychological factors (Dobson and Dozois, 2008), remarkably few studies have examined the interaction of these factors in the onset or maintenance of the disorder.

A large epidemiological literature has demonstrated a pervasive link between income inequality and poorer mental health, including depression (reviewed in Wilkinson and Pickett, 2009). However, surprisingly little research has examined whether a key consequence of the individual-level, subjective experience of

inequality—*subjective relative deprivation*—is similarly associated with depressive symptoms. In the following, we review evidence suggesting that subjective relative deprivation should be associated with depressive symptoms, and present two studies (across four samples) demonstrating that subjective relative deprivation is consistently associated with depressive symptoms and with depression-related cognitions.

1.1. Relative deprivation and mental health

Aggregate-level inequality has been robustly associated with a wide array of negative physical and mental health outcomes (Subramanian and Kawachi, 2004; Pickett and Wilkinson, 2006, 2010, 2015; Wilkinson and Pickett, 2006, 2007, 2009), including depressive symptoms and diagnosed depression (Belle and Doucet, 2003; Muramatsu, 2003; Pabayo et al., 2013). However, it is unclear how aggregate-level inequality affects individual-level mental health. The *relative deprivation hypothesis* suggests inequality motivates individual-level socioeconomic comparisons, which lead to poorer social relations, in turn leading to stress and eventually, poorer mental health and well-being (reviewed in Wilkinson and

* Corresponding author. Department of Psychology, University of Regina, 3737 Wascana Parkway, Regina, Saskatchewan, S4S0A2, Canada.
E-mail address: Shadi.beshai@uregina.ca (S. Beshai).

Pickett, 2006, 2007, 2009). More generally, relative deprivation can be conceptualized as an affective response (i.e., an emotional response manifesting in frustration, anger, and/or resentment) to perceived deprivation of desired or deserved outcomes relative to others (Bernstein and Crosby, 1980; Smith and Huo, 2014). Runciman (1966) set four preconditions to relative deprivation, which include the desire for a particular outcome, comparison of one's self to others, feeling entitled to have this outcome, and believing that it is possible to obtain this outcome (Runciman, 1966).

Much of the research on relative deprivation has involved using economic measures to approximate relative deprivation (e.g., through quantification of income inequality; Jones and Wildman, 2008; Wilkinson and Pickett, 2007; Yngwe et al., 2003). Others have measured population-level relative deprivation in broader objective socioeconomic terms. For example, the Yitzhaki Index is a computation of an individuals' objective socioeconomic status, outcomes, or experiences relative to those in the population that score higher (or lower) on such measures (Yitzhaki, 1979). The Carstairs Index and the Townsend Index are computed similarly, and include such factors as the unemployment rate, or proportion of people who do not own a car (reviewed in Morris and Carstairs, 1991). Another thread of research has examined the link between subjective socioeconomic status and mental health. Demakakos et al. (2008) found that subjective social status significantly predicted a number of health related outcomes, including depression; in addition, they found subjective status to mediate the relationship between pertinent socioeconomic variables (e.g., education, occupational status) and health. Franzini and Fernandez-Esquer (2006) found that subjective social status was significantly associated with mental health outcomes among a low-income minority sample, even after controlling for objective social status. Callan et al. (2015) found that subjective socioeconomic status was associated with general distress and depressive symptoms.

Although suggestive, this extant relative deprivation research suffers from two key limitations. First, aggregate approximations of relative deprivation are necessarily objective, not subjective. This distinction is key given that objective deprivation may not directly influence subjective deprivation. For example, someone who does not engage in high levels of social comparisons, or someone who is poor in an environment of low inequality, may not experience high levels of subjective deprivation. In support of this notion, some evidence suggests surprisingly low correlations between objective measures of deprivation (e.g., unemployment, household/individual earnings, debt) and subjective relative deprivation (e.g., Mishra and Carleton, 2015). Second, although subjective socioeconomic status necessarily involves a personal, subjective assessment of relative standing, this assessment is devoid of the key *affective* component of relative deprivation. Subjective relative deprivation is necessarily defined by affective and cognitive (i.e., appraisal) responses to perceived unfair outcomes, not just a non-emotional social comparison.

At the individual level, some research has linked social comparisons and stress — two key associated components of relative deprivation — to depressive symptoms. Individual-level comparisons of one's own abilities, attractiveness, and performance have been robustly associated with heightened depression symptoms (Butzer and Kuiper, 2006; Cattarin et al., 2000; Furnham and Brewin, 1988; Gibbons and Gerrard, 1989; Jones, 2001; Suls et al., 2002). Frequency of social comparison has also been associated with heightened depressive symptoms (Butzer and Kuiper, 2006; Furnham and Brewin, 1988). A large body of evidence has also linked depressive symptoms with stress (Hammen, 2005). This research has substantiated the role of both major life events and minor events or daily hassles in the onset and maintenance of

depression symptoms (Mazza and Reynolds, 1998). Research also shows that stress may be directly causal to depressive symptoms, especially in the presence of other cognitive and social risk factors (Harkness and Monroe, 2006).

Despite research linking social comparisons and stress to depression, surprisingly little research has directly examined whether the individual-level subjective experience of relative deprivation is associated with poorer mental health, although two recent studies are suggestive. Mishra and Carleton (2015) demonstrated that subjective relative deprivation was associated with poorer mental health above and beyond known factors associated with both relative deprivation and health (e.g., social support, income). Similarly, Callan et al. (2015) demonstrated that subjective relative deprivation was associated with poorer self-rated mental health (e.g., negative affect, perceived stress, sleep quality, and general well-being).

1.2. Cognitive models, depressive symptoms, and emotion regulation

Cognitive models of depression (Abramson, Metalsky and Alloy, 1989; Beck, 1979) represent some of the most evaluated and widely adopted of all models of the disorder. According to Beck's highly influential cognitive model of depression (Beck and Bredemeier, 2016; Clark and Beck, 1999), there are multiple hierarchical structures involved in processing information, and such structures tend to be negatively skewed in depression. For example, automatic thoughts are the most accessible structures, while attitudes (known as "rules for living") are intermediary structures. Individuals with heightened depression symptoms often harbor "dysfunctional" attitudes or assumptions, which usually exist in the form of "if-then" propositions (Dozois and Beck, 2008). For example, a person with a cognitive vulnerability to depressive symptoms might believe that "if *everyone* does not love me, then I must be unlovable" (a dysfunctional attitude). When these dysfunctional attitudes are activated, they cause activation of negative automatic thoughts about the self, world and future (e.g., "I am no good"; "My future is bleak"), which are the closest in proximity to depressive symptoms. As a consequence, the relationship between dysfunctional attitudes and depressive symptoms is hypothesized to be mediated by negative automatic thoughts. Consistent with this hypothesis, individuals who suffer from depression or who show elevated symptoms harbor more frequent and intense negative thoughts about self, world, and future (Beshai et al., 2012; Beshai et al., 2016), and more dysfunctional attitudes (Beshai et al., 2015) compared to non-depressed individuals.

People who experience depressive symptoms attempt to address such symptoms by engaging in emotion regulation — the management of positive (happiness, joy) and negative (sadness, anger) emotions (Gross and John, 2003). Research indicates that emotion regulation is an important part of emotional health. In particular, management of sad mood has been linked to the maintenance of depression symptoms (Berking and Wupperman, 2012). Results of multiple investigations show that some emotion regulation strategies are adaptive (e.g., cognitive reappraisal), while others are less adaptive (e.g., suppression) (Gross, 2013).

Given the relatively robust association between subjective relative deprivation and measures of depressive symptoms, it is possible that subjective relative deprivation may be more involved in the activation of more proximal mechanisms of depression, namely negative automatic thoughts. As a consequence, we explored whether subjective relative deprivation may lead to depressive symptoms through the same proximal mechanisms proposed by Beck's model.

1.3. Overview

Taken together, the limited extant evidence suggests that relative deprivation is associated with poorer mental health. We sought to more comprehensively investigate relationships between subjective relative deprivation, depressive symptoms, and cognitive processes involved in depression. The current study examined (1) the relationship between depressive symptoms and subjective relative deprivation (Study 1), (2) whether subjective relative deprivation incrementally predicts depressive symptoms beyond depressogenic cognitions, emotional regulation, and subjective stress (Study 2), and (3) whether negative automatic thoughts mediated the relationship between subjective relative deprivation and depressive symptoms (Study 2).

We predicted that subjective relative deprivation would be positively correlated with depressive symptoms. Further, we predicted that subjective relative deprivation would explain variance in depression symptoms over and above known correlates of such symptoms (negative thoughts, dysfunctional attitudes, subjective stress, emotion regulation). Finally, we explored whether the relationship between subjective relative deprivation and depressive symptoms is mediated by negative automatic thoughts.

2. Study 1

In Study 1, we examined whether subjective relative deprivation is associated with depressive symptoms measured in a number of ways and across three different samples. Among the first sample (A), we measured depression symptomology using the frequently used Mental Health Inventory (MHI), seeking to replicate the findings of Mishra and Carleton (2015). In the second sample (B), we also utilized the MHI, and the depression subscale of the widely used Depression and Anxiety Stress Scale (DASS; Henry and Crawford, 2005). In the third sample (C), we examined associations of relative deprivation with the DASS, as well as associations with depression symptomology as measured using the Center for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977; used in Callan et al., 2015). Across all samples in Study 1, we expected that subjective relative deprivation would be associated with measures of depressive symptoms above and beyond known demographic risk factors for poor mental health.

2.1. Method

Study 1 participants (samples A, B and C) were recruited through CrowdFlower, an online crowdsourcing platform. Crowd-Flower and other crowdsourcing platforms have been used extensively in behavioral and clinical research (Chandler and Shapiro, 2016; Le et al., 2010). CrowdFlower is an international alternative to the widely used US-based platform MechanicalTurk (MTurk). Unlike MTurk, which has its own workforce (i.e., potential participant pool), CrowdFlower disseminates study tasks to various partner channels, each with their own workforce. Since its inception, there have been over 1 billion tasks completed on Crowd-Flower by over 5 million unique participants (De Winter et al., 2015).

Participants were required to speak English proficiently, be at least 18 years of age, and to reside in an English-speaking nation (Canada, United States, United Kingdom, New Zealand, and Australia). Samples A, B, and C consisted of a total of $N = 719$, $N = 713$, and $N = 709$ participants, respectively. Table 1 provides descriptive statistics of pertinent demographic variables among the three samples of Study 1. Data for Study 1 were collected between September and November 2015. All participants were compensated financially for their participation.

2.2. Measures

The *Personal Relative Deprivation Scale — Revised* (PRDS-R; Callan et al., 2011) consists of the following five items assessing subjective relative deprivation: (1) "I feel deprived when I think about what I have compared to what other people like me have"; (2) "I feel privileged compared to other people like me"; (3) " I feel resentful when I see how prosperous other people like me seem to be"; (4) "When I compare what I have with what others like me have, I realize that I am quite well off"; (5) "I feel dissatisfied with what I have compared to what other people like me have". Items were rated on six-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The scale has been shown to be reliable and internally consistent (e.g., Callan et al., 2011), and has been associated with a wide array of relevant outcomes including mental and physical health, gambling urges, problem gambling tendencies, delay discounting, antisocial and criminal conduct, and traits associated with risk-taking (Callan et al., 2008, 2011, 2015; Mishra and Carleton, 2015; Mishra and Novakowski, 2016).

The *Mental Health Inventory* (MHI; Berwick et al., 1991) is a six-item self-report scale that broadly measures mood and anxiety symptomology. We used the 5-item refined scale, with ratings of frequency of symptoms ranging from 1 (*none of the time*) to 5 (*all of the time*) (Rumpf et al., 2001). This measure has been used frequently as a screening tool for mental health problems as well as problems with depression and anxiety, especially in large epidemiological samples.

Depression Anxiety Stress Scale (DASS; Henry and Crawford, 2005). The depression subscale of the DASS measures negative affective tendencies in the past week using seven items (e.g., "I couldn't seem to experience any positive feeling at all") assessed on a four-point scale from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). The DASS has demonstrably excellent psychometric properties among clinical and community samples (Antony et al., 1998).

Center for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977). The CESD is comprised of 20 items that assess depressive symptoms experienced in the past week (e.g., "I felt that I could not shake off the blues even with help from my family or friends"). Items were assessed on a scale from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). The CESD (Radloff, 1977) has been shown to be both reliable and valid (reviewed in Carleton et al., 2013).

2.3. Results

In Studies 1 and 2, cases with missing values were not included in the analyses. In accordance with suggestions by Chandler and Shapiro (2016), all participants who completed the questionnaires in this and the subsequent study were included in the final analyses, despite failure to pass the included attention checks.

Scores on the PRDS-R were significantly and positively associated with scores on the MHI among sample A, $r = 0.52$, $p < 0.001$. Among sample B, PRDS-R scores were significantly associated with scores on the depression subscale of the DASS, $r = 0.49$, $p < 0.001$, and on the MHI, $r = 0.52$, $p < 0.001$. Also among Sample B, the DASS depression subscale and MHI scores were significantly correlated, $r = 0.82$, $p < 0.001$. Among sample C, PRDS-R scores were associated with greater depression symptomology as measured using the DASS, $r = 0.50$, $p < 0.001$, and the CESD, $r = 0.36$, $p < 0.001$. Finally, DASS depression subscale scores and CESD scores were significantly correlated in Sample C, $r = 0.87$, $p < 0.001$. Associations between subjective relative deprivation and various measures of depressive symptomology were highly consistent across all three samples, with approximately 13—25% of variance in depressive symptoms explained by subjective relative deprivation.

Table 1
Demographic characteristics of the three samples in Study 1.

	Sample A $N = 719$	Sample B $N = 713$	Sample C $N = 709$
Age: M (SD)	38.58 (13.34)	37.36 (13.62)	38.37 (12.95)
Sex: n (%)			
Female	396 (55.2)	414 (58.1)	293 (43.7)
Marital status			
Single	254 (35.4)	196 (29.3)	208 (31.1)
Dating	55 (7.7)	79 (11.8)	72 (10.8)
Married/Common-law	362 (50.4)	343 (51.3)	344 (51.5)
Separated/Divorced	32 (4.5)	39 (5.8)	34 (5.1)
Widowed	15 (2.1)	11 (1.6)	10 (1.5)
Education			
Secondary School or below	151 (21.0)	138 (20.6)	155 (23.2)
Some college/university	192 (26.7)	173 (25.7)	162 (24.3)
College/University	259 (36.1)	260 (38.8)	248 (37.1)
Post-Graduate/Professional School	116 (16.1)	100 (14.9)	103 (15.4)
Personal Annual Income			
Less than $10,000	211 (29.8)	185 (28.1)	183 (27.5)
$10,000–$50,000	351 (49.4)	331 (50.2)	330 (49.6)
Over $50,000	147 (20.8)	143 (21.7)	152 (22.8)
PRDS-R: M (SD)	16.51 (5.41)	17.45 (6.03)	19.36 (3.80)
MHI	12.80 (3.88)	12.80 (4.29)	
DASS-Depression		10.97 (10.60)	11.43 (11.05)
CESD			19.00 (8.60)

Note. PRDS - R = Personal Relative Deprivation Scale-Revised; MHI = Mental Health Inventory; DASS-Depression = Depression, Anxiety, Stress Scale, Depression sub-scale; CESD = Centre for Epidemiological Studies Depression Scale.

Among all three samples of Study 1, we conducted sequential regression analyses in order to examine whether PRDS-R scores significantly predicted MHI (Model A; Sample A), DASS Depression Subscale (Model B; Sample B), and CESD (Model C; Sample C) scores over and above age, sex, marital status, education, and personal income (all known demographic correlates of mental health). Accordingly, demographic variables in each of the three models were entered in the first block, and PRDS-R scores were entered in the second block. These analyses revealed that PRDS-R scores were a significant predictor of scores on these depressive symptom measures even after accounting for variance contributed by the above named variables (Table 2).

3. Study 2

Study 1 demonstrated that subjective relative deprivation is robustly associated with various measures of depressive symptoms. Study 2 sought to replicate and extend Study 1 by examining whether proximate mechanisms involved in depression are also in turn associated with subjective relative deprivation. As reviewed in the introduction, two of the variables examined — dysfunctional attitudes and negative automatic thoughts — are central in Beck's (1979) seminal cognitive model for depression. Dysfunctional attitudes in depression (e.g., "if *everyone* does not love me, then I must be unlovable") are considered "rules for living", and they precede automatic negative thoughts (e.g., "I am no good"), which in turn may directly lead to depressive symptoms. Depressive symptoms then motivate emotion regulation, which are strategies people use to manage or control intense negative emotions. Finally, stress is psychological and physiological tension that individuals may experience when an outside stimulus (stressor) is construed as "dangerous" and/or this stimulus is believed to overwhelm one's coping ability.

In Study 2, we specifically examined whether subjective relative deprivation is able to predict depressive symptoms after controlling for key demographic and psychological variables — depressogenic cognitions (negative automatic thoughts; dysfunctional attitudes),

Table 2
Three regression models corresponding to the three samples of Study 1 of subjective relative deprivation as significant predictor of MHI scores, DASS-Depression sub-scale scores, and CESD scores, above and beyond five demographic variables.

	B	SE	β	t
Model A (Sample A): MHI Scores				
Step 1: $R = 0.30$, $R^2 = 0.09^{***}$				
Age	-0.05	0.01	-0.18	−4.13***
Sex	0.99	0.31	0.13	3.24***
Marital Status	-0.39	0.16	-0.11	−2.48**
Education	-0.12	0.13	-0.04	−0.92
Personal Income	-0.16	0.08	-0.09	−2.12*
Step 2: $R = 0.56$, $\Delta R^2 = 0.22^{***}$				
PRDS-R	0.35	0.03	0.49	14.23***
Model B (Sample B): DASS-Depression Scores				
Step 1: $R = 0.26$, $R^2 = 0.07^{***}$				
Age	-0.11	0.04	-0.13	−3.13**
Sex	-0.11	0.89	-0.01	−0.13
Marital Status	-0.97	0.46	-0.09	−2.12*
Education	-0.67	0.38	-0.07	−1.78
Personal Income	-0.55	0.22	-0.11	−2.52**
Step 2: $R = 0.51$, $\Delta R^2 = 0.19^{***}$				
PRDS-R	0.81	0.06	0.45	12.61***
Model C (Sample C): CESD Scores				
Step 1: $R = 0.23$, $R^2 = 0.05^{***}$				
Age	-0.07	0.03	-0.11	−2.53**
Sex	2.18	0.69	0.13	3.14*
Marital Status	-0.24	0.38	-0.03	−0.64
Education	-0.08	0.31	-0.01	−0.26
Personal Income	-0.39	0.18	-0.10	−2.18*
Step 2: $R = 0.40$, $\Delta R^2 = 0.11^{***}$				
PRDS-R	0.48	0.06	0.34	8.77***

Note. PRDS - R = Personal Relative Deprivation Scale-Revised; MHI = Mental Health Inventory; DASS-Depression = Depression, Anxiety, Stress Scale, Depression sub-scale; CESD = Centre for Epidemiological Studies Depression Scale.
$^*p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

stress, and emotion regulation (reappraisal and suppression) — that have been shown to be highly correlated with such symptoms (Clark and Beck, 1999; Beshai et al., 2016).

3.1. Method

All participants were compensated financially. Study 2 employed the *Personal Relative Deprivation Scale* (as in Study 1), along with measures of depressive symptomology and cognitions, as described below. Participant recruitment for this study was not restricted by country or region of origin. Data for Study 2 were gathered in December 2015.

The *Patient Health Questionnaire-8* (PHQ-8; Kroenke et al., 2009) is an eight-item measure that assesses depression symptoms based on the Diagnostic Statistical Manual IV (DSM-IV) criteria of depression (e.g., little interest or pleasure in doing things, feeling down depressed, or hopeless, trouble falling or staying asleep, or sleeping to much). Participants are asked to rate, from (0) "*not at all*" to (3) "*nearly every day*", how often they have experienced depressive symptoms over the past two weeks. The PHQ-8 has been used extensively in depression research, and has demonstrated sound psychometric properties (Kroenke et al., 2009).

The *Automatic Thoughts Questionnaire* (ATQ-N; Hollon and Kendall, 1980) assesses frequency of negative cognitions in depression. This questionnaire consists of 30-items, and each item is rated on a 5-point scale, with (1) being "*not at all*" and (5) being "*all of the time*". Examples of items are "My future is bleak" and "I'm no good". Participants were instructed to indicate how often they experienced the listed thoughts over the past week. Previous studies using the ATQ-N have demonstrated the scale's reliability and validity among clinical and general population samples (Beshai et al., 2012).

Table 3
Sample characteristics for Study 2.

	N = 858
Age: Mean (SD)	31.36 (8.99)
Gender (%):	
Female	250 (29.1)
Marital Status (%):	
Single	489 (57.0)
Married	319 (37.2)
Separated/Divorced	33 (3.8)
Widowed	8 (0.9)
No answer provided	9 (1.0)
Education (%):	
Secondary school or below	187 (21.8)
Certificate or diploma below College/university level	128 (14.9)
Trade school/College	28 (3.26)
University	224 (26.1)
Post-undergraduate/Professional School	291 (33.9)
Personal Income (%):	
Under $10,000	192 (22.4)
$10,000 - $50,000	424 (49.4)
Over $50,000	120 (14.0)
None of the above/Do not want to answer	122 (14.2)
Continent	
Africa	19 (2.2)
Asia	143 (16.8)
North America	110 (12.9)
Europe	430 (50.5)
South America	126 (14.8)
Cannot be defined	24 (2.8)

The *Dysfunctional Attitude Scale* (DAS; Weissman and Beck, 1978) is a 24-item scale that measures negative attitudes of a depressed person. Specifically, the scale examines dysfunctional attitudes and statements that may be related to depression (Power et al., 1994). The scale lists several attitudes ("if … then" statements) or beliefs that people sometimes hold and asks participants to rate them on a 7-point Likert scale, ranging from (1) "*totally disagree*" to (7) "*totally agree*" (after reversals). The DAS has been shown to be reliable and valid (Beshai et al., 2013; Weissman and Beck, 1978).

The *Stress Overload Scale* (SOS; Amirkhan, 2012) is a 10-item scale that measures individuals' level of stress. Items are rated on a 5-point scale, which range from (1) "*Not at all*" to (5) "*A lot*" and includes questions like "In the past week, have you felt like you couldn't cope?" The SOS has been shown to be psychometrically sound and has been associated with individual health (Amirkhan, 2012).

The *Emotion Regulation Questionnaire* (ERQ; Gross and John, 2003) measures individual differences in emotion regulation. The 10-item scale uses a 7-point Likert scale ranging from (1) "*strongly disagree*" to (7) "*strongly agree*". Questions on the ERQ ask about one's emotional life and the use of two strategies to manage emotions: cognitive reappraisal and emotional suppression (e.g., "I keep my emotions to myself"; "When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm"). Reappraisal strategies have typically been viewed as adaptive, while suppression has been viewed as maladaptive in regulating emotion (Gross, 2013). The ERQ has been used extensively and has demonstrated excellent psychometric properties among general and clinical populations (Gross and John, 2003).

Zero-order correlation coefficients were obtained to examine the relationships between total subjective relative deprivation scores and scores on the PHQ-8 (depression symptoms), ATQ-N (negative thoughts), DAS (dysfunctional attitudes), SOS (stress), and ERQ Suppression and Reappraisal (emotion regulation) subscales.

As planned, we conducted a sequential regression analysis to examine whether PRDS-R scores would predict scores on the PHQ-8, above and beyond variance accounted for by demographic variables (Block 1), and other known correlates of depressive symptoms (negative thoughts, dysfunctional attitudes, stress, and emotion regulation strategies) (Block 2). Accordingly, demographic variables such as age, gender, marital status, education, and personal income were entered in the first block, scores on the ATQ-N, DAS, SOS, and ERQ Suppression and Reappraisal subscales were entered in the second block of the equation, PRDS-R scores were entered in the third block, and PHQ-8 scores were used as the dependent variable.

3.2. Results

Study 2 sample characteristics are summarized in Table 3. Participants were recruited through CrowdFlower. A total of 858 participants ($M = 31.3$, $SD = 9.03$, Range 18−69) completed the study. A total of 250 (29.1%) women took part in the study.

Correlation coefficients are summarized in Table 4. Results showed significant and positive relationships between total subjective deprivation scores and scores on the PHQ-8, ATQ-N, DAS, SOS, and Suppression. There was also a significant and negative correlation between total PRDS-R scores and scores on the ERQ Reappraisal scale. Together, these results suggest that subjective relative deprivation is robustly associated with depressive symptomology, as well as cognitions and emotions involved in the etiology of depression.

The first sequential regression analysis revealed that demographic variables (Block 1) predicted 3.0% ($R^2 = 0.03$) of PHQ-8 scores, and ATQ-N (negative thoughts), DAS (dysfunctional attitudes), SOS (stress), and ERQ (emotion regulation) scores (Block 2) predicted 61% ($R^2 = 0.61$; $\Delta R^2 = 0.57$, $p > 0.001$) of the variance in PHQ-8 scores. In Block 3, PRDS-R scores represented a non-significant change in variance accounted for in the model ($\Delta R^2 = 0.00$, $p > 0.05$). However, a second sequential regression

Table 4
Correlations between subjective relative deprivation, depressive symptoms, and cognitive measures.

	PRDS-R	PHQ-8	ATQ	DAS	SOS	ERQ-Reappraisal	ERQ-Suppression
PRDS-R	1.00	0.35*	0.46*	0.22*	0.36*	-0.16*	0.16*
PHQ-8		1.00	0.74*	0.32*	0.66*	0.01	0.28*
ATQ			1.00	0.32*	0.71*	-0.05	0.24*
DAS				1.00	0.30*	0.01	0.16*
SOS					1.00	0.02	0.26*
ERQ-Reappraisal						1.00	0.27*
ERQ- Suppression							1.00

*$p < 0.001$.
Note. PRDS-R = Personal Relative Depression Scale-Revised total scores; PHQ-8 = Patient Health Questionnaire-8 total score; ATQ = Automatic Thought Questionnaire total scores; DAS = Dysfunctional Attitude Scale total score; SOS = Stress Overload Scale total score, ERQ = Emotion Regulation Questionnaire; ERQ - Reappraisal = ERQ Reappraisal totals score; ERQ-Suppression total score.

Table 5
Subjective relative deprivation as a predictor of PHQ-8 Scores over and above demographic variables, and other correlates of depression (ATQ-N scores omitted).

	B	SE	β	t
Step 1: $R = 0.17$, $R^2 = 0.03$***				
Age	-0.08	0.02	-0.13	−3.31***
Gender	0.57	0.43	0.05	1.33
Marital Status	0.08	0.30	0.01	0.26
Education	-0.16	0.08	-0.08	−2.10*
Personal Income	-0.17	0.11	-0.06	−1.55
Step 2: $R = 0.69$, $\Delta R^2 = 0.45$***				
DAS	-0.04	0.01	-0.13	−4.65***
SOS	0.17	0.01	0.59	20.86***
ERQ − Suppression	0.15	0.03	0.13	4.46***
ERQ − Reappraisal	-0.05	0.04	-0.04	−1.36
Step 2: $R = 0.70$, $\Delta R^2 = 0.01$***				
PRDS-R	0.14	0.04	0.10	3.32***

Note. PRDS - R = Personal Relative Deprivation Scale-Revised; MHI = Mental Health Inventory; DASS-Depression = Depression, Anxiety, Stress Scale, Depression subscale; CESD = Centre for Epidemiological Studies Depression Scale.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

analysis revealed that, when ATQ-N scores were not entered in the second block of the equation, total PRDS-R scores were significantly and positively predictive of PHQ-8, over and above other correlates of depression symptoms (Table 5).

We conducted a third sequential regression analysis to examine whether subjective relative deprivation scores (Block 3) would predict frequency and intensity of negative automatic thoughts (ATQ-N), over and above demographic variables (Block 1), and scores on measures of depressive symptomology (PHQ-8), dysfunctional attitudes (DAS), stress (SOS), and emotion regulation (EQR) (Block 2). Total PHQ-8, DAS, SOS, and ERQ Suppression and Reappraisal subscale scores were entered in block two of the equation, while PRDS-R scores were entered in the third block, and ATQ-N scores were the dependent variable. This analysis revealed that PRDS-R scores significantly and positively predicted scores on the ATQ-N, over and above demographic measures, and scores on other measures that contribute to negative automatic thoughts (Table 6).

Finally, we used Hyes' (2013) PROCESS plugin for SPSS to examine whether the relationship between subjective relative deprivation and depressive symptoms was mediated by negative automatic thoughts. This analysis showed that automatic negative thoughts (ATQ-N scores) fully mediated the relationship between

Table 6
Subjective relative deprivation as a predictor of ATQ-N Scores over and above demographic variables, and other correlates of negative thoughts.

	B	SE	β	t
Step 1: $R = 0.13$, $R^2 = 0.02$*				
Age	-0.16	0.14	-0.05	−1.17
Gender	-0.24	2.42	-0.00	−0.99
Marital Status	−1.16	1.77	-0.03	−0.65
Education	-0.66	0.44	-0.06	−1.49
Personal Income	−1.21	0.62	-0.08	−1.96*
Step 2: $R = 0.80$, $\Delta R^2 = 0.62$***				
PHQ-8	2.45	0.17	0.46	14.49***
DAS	-0.09	0.04	-0.05	−2.10*
SOS	0.59	0.05	0.39	12.67***
ERQ − Suppression	0.21	0.16	0.03	1.37
ERQ − Reappraisal	-0.46	0.17	-0.07	−2.78**
Step 2: $R = 0.81$, $\Delta R^2 = 0.02$***				
PRDS-R	1.24	0.19	0.16	6.52***

Note. PRDS - R = Personal Relative Deprivation Scale-Revised; MHI = Mental Health Inventory; DASS-Depression = Depression, Anxiety, Stress Scale, Depression subscale; CESD = Centre for Epidemiological Studies Depression Scale.
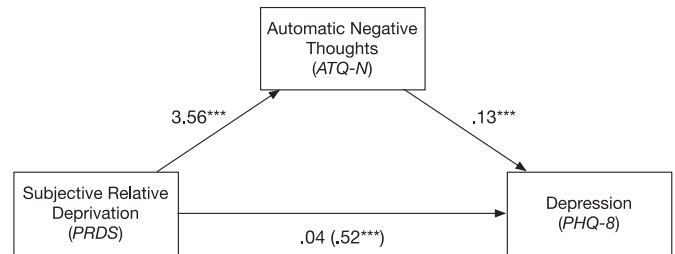*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Fig. 1. Automatic negative thoughts mediate the relationship between subjective relative deprivation and depressive symptomology. The value in brackets is the association between relative deprivation and depression without controlling for automatic negative thoughts.

subjective relative deprivation (PRDS-R scores) and depressive symptomology (PHQ-8 scores), as confirmed by a Sobel Test in accordance with Preacher and Kelly's (2011) Kappa-Squared analysis and Barron and Kenny's (1986) mediation criteria, $Z = 12.36$, $p < 0.001$, $\kappa^2 = 0.36$ (Fig. 1).

Additional exploratory mediational analyses were conducted using dysfunctional attitudes, stress, and emotion regulation (reappraisal and suppression) as mediators. These analyses evidenced that dysfunctional attitudes (DAS), stress (SOS), and suppression (ERQ-Suppression subscale) all partially mediated the relationship of subjective relative deprivation and depressive symptoms (see Supplementary Materials).

4. General discussion

Across four samples, we demonstrated that subjective relative deprivation was positively associated with depressive symptoms. These correlations were moderate (0.3 −0.5) and were consistent across different measures of depressive symptoms (CESD; DASS-Depression; MHI; PHQ-8). Across all samples, we also found subjective relative deprivation explained variance in depressive symptoms above and beyond known demographic correlates of mental health. In Study 2, we found that relative deprivation can incrementally predict depressive symptoms beyond dysfunctional attitudes, stress and emotion regulation strategies. We also demonstrated that subjective relative deprivation may function to increase depressive symptoms through an increase in negative automatic self-referent thoughts.

Our results indicated that subjective relative deprivation is in part distinct from depressogenic cognitions, and together, these constructs predict approximately 60% of the variance in depression symptoms. These results are consistent with previous studies linking negative cognitions with depression symptoms (Beshai et al., 2012, 2016) and subjective relative deprivation with negative physical and psychological health outcomes (Adler et al., 2000; Callan et al., 2015; Mishra and Carleton, 2015; Mishra and Novakowski, 2016). Further, our mediational analysis suggests subjective relative deprivation may maintain depressive symptoms by increasing negative thoughts about self (Kwon and Oei, 1992; Suls et al., 2002). This finding highlights the role of subjective relative deprivation as a risk factor for depressive symptoms (Butzer and Kuiper, 2006; Suls et al., 2002). Negative self-referent thoughts have been found to correlate with depressive symptoms (Beshai et al., 2016). However, research that examines this cognitive feature as playing a role in vulnerability processes in depression has been sparse.

Results of our study also suggest that social and cognitive elements may interact to exacerbate psychopathology. Risk and vulnerability factors in depression, whether they are biological, social, or cognitive, seldom occur in isolation (Ingram et al., 1998).

Consequently, this study bridges the gap between social and cognitive-clinical science, and highlights the importance of examining the interaction of various forms of risk in predisposing individuals to the onset or maintenance of depressive symptoms.

The present study extends previous work in several important ways. First, previous research has almost exclusively examined associations between indices of objective relative deprivation and mental health outcomes. In contrast, our study examined associations between an individual-level subjective measure of relative deprivation and depressive symptoms. Second, across our studies, we used multiple highly validated measures of depressive symptoms. The two studies that have previously examined subjective relative deprivation and mental health have utilized either limited brief measures of mental health (Mishra and Carleton, 2015), or single measures of depressive symptoms (Callan et al., 2015). Third, we demonstrated that our results are replicable and robust over multiple samples. Fourth, we demonstrated that there are parallels (and possible interactions) between the socio-cognitive mechanisms of depression and those of subjective relative deprivation.

The present study has some limitations that provide directions for future research. First, all four samples were convenience and crowdsourced samples. Crowdsourced samples are not entirely representative of the general population; they tend to be younger, more educated, and present with a particular clinical profile (Chandler and Shapiro, 2016). However, Berinsky et al. (2012) found that MTurk crowdsourced samples were more representative of the general population than college student samples. Regardless, our recruitment strategy somewhat limits the generalizability of our results.

The cross-sectional nature of our design does not allow causal inference. Although PRDS-R scores were presented as a predictor of depressive symptoms, the reverse may very well be true (i.e., individuals who show heightened depressive symptoms may be more likely to have higher subjective relative deprivation scores). We do note, however, that theory around the relative deprivation hypothesis strongly suggests that relative deprivation is a precursor to poorer mental health. Using longitudinal and experimental designs, future research should attempt to establish causality between these associated variables.

Participants for Study 1 were recruited from a number of English-speaking nations, while participant recruitment for Study 2 was open to individuals across the globe. This international recruitment may have introduced a number of confounds to the present results, as individuals from varying cultures may respond systematically different on the included measures. Further, and particularly in Study 2, there was no way to test for English proficiency, and therefore comprehension of the included measures could not be ascertained.

We used scores on self-report measures to ascertain depressive symptoms. Self-report measures of depressive symptoms may lack sensitivity and specificity in comparison to the gold-standard, structured clinical interviews. However, the measures used in the current investigations were all psychometrically sound, and have been used extensively in depression research.

Future studies should further substantiate the relationship of social comparison with depressive symptomology. Subjective relative deprivation is a multifaceted construct that not only captures frequency of social comparison, but also the propellant forces of these comparisons (negative cognitive appraisals) and their emotional consequences (Smith et al., 2012). Although the PRDS-R captures these subdomains of subjective relative deprivation, the scale does not distinguish between them due to its brevity. Future studies should examine exactly which sub-constructs of relative deprivation drive the relationship with depressive symptoms. Future studies should also consider examining the role of other cognitive features, (e.g., rumination) in the relationship of subjective relative deprivation and depression symptoms.

Together, our results demonstrate the importance of relative deprivation and other emotional consequences of inequality. Accordingly, there is a need for social and political action to reduce inequality and its pernicious effects. The results of the present study also highlight the need to acknowledge the interaction of social and cognitive risk factors in the context of therapy for depression, especially cognitive-behavioural therapy, as this interaction may be associated with the maintenance of the condition.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2016.11.021.

References

Abramson, L.Y., Metalsky, G.I., Alloy, L.B., 1989. Hopelessness depression: A theory-based subtype of depression. Psychol. Rev. 96 (2), 358.

Adler, N.E., Epel, E.S., Castellazzo, G., Ickovics, J.R., 2000. Relationship of subjective and objective social status with psychological and physiological functioning: preliminary data in healthy, White women. Health Psychol. 19 (6), 586–592.

Amirkhan, J.H., 2012. Stress overload: a new approach to the assessment of stress. Am. J. Community Psychol. 49 (1–2), 55–71.

Antony, M.M., Bieling, P.J., Cox, B.J., Enns, M.W., Swinson, R.P., 1998. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. Psychol. Assess. 10 (2), 176–181.

Baron, R.M., Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. J. Personal. Soc. Psychol. 51 (6), 1173–1182.

Beck, A.T., 1979. Cognitive Therapy of Depression. Guilford Press, New York, NY.

Beck, A.T., Bredemeier, K., 2016. A unified model of depression integrating clinical, cognitive, biological, and evolutionary perspectives. Clin. Psychol. Sci. http://dx.doi.org/10.1177/2167702616628523 ahead of Print.

Belle, D., Doucet, J., 2003. Poverty, inequality, and discrimination as sources of depression among U.S. women. Psychol. Women Q. 27, 101–113.

Berking, M., Wupperman, P., 2012. Emotion regulation and mental health: recent findings, current challenges, and future directions. Curr. Opin. Psychiatry 25 (2), 128–134.

Bernstein, M., Crosby, F., 1980. An empirical examination of relative deprivation theory. J. Exp. Soc. Psychol. 16 (5), 442–456.

Berwick, D.M., Murphy, J.M., Goldman, P.A., Ware Jr., J.E., Barsky, A.J., Weinstein, M.C., 1991. Performance of a five-item mental health screening test. Med. Care 29 (2), 169–176.

Beshai, S., Branco, L.D., Dobson, K.S., 2013. Lemons into lemonade: development and validation of an inventory to assess dispositional thriving. Europe's J. Psychol. 9 (1), 62–76.

Beshai, S., Dobson, K.S., Adel, A., 2012. Cognition and dysphoria in Egypt and Canada: an examination of the cognitive triad. Can. J. Behav. Sci./Rev. Can. des Sci. du comport. 44 (1), 29–39.

Beshai, S., Dobson, K.S., Adel, A., Hanna, N., 2016. A cross-cultural study of the cognitive model of depression: cognitive experiences converge between Egypt and Canada. PloS one 11 (3), e0150699.

Beshai, S., Prentice, J.L., Swan, J.L., Dobson, K.S., 2015. The effects of dysphoria and personality on negative self-referent attitudes and perceptions of the attitudes of others. J. Psychol. 149 (5), 498–516.

Berinsky, A.J., Huber, G.A., Lenz, G.S., 2012. Evaluating online labor markets for experimental research: Amazon. com's Mechanical Turk. Polit. Anal. 20 (3), 351–368.

Butzer, B., Kuiper, N.A., 2006. Relationships between the frequency of social comparisons and self-concept clarity, intolerance of uncertainty, anxiety, and depression. Personal. Individ. Differ. 41 (1), 167–176.

Callan, M.J., Ellard, J.H., Shead, N.W., Hodgins, D.C., 2008. Gambling as a search for justice: examining the role of personal relative deprivation in gambling urges and gambling behavior. Personal. Soc. Psychol. Bull. 34 (11), 1514–1529.

Callan, M.J., Kim, H., Matthews, W.J., 2015. Predicting self-rated mental and physical health: the contributions of subjective socioeconomic status and personal relative deprivation. Front. Psychol. 6, 1415.

Callan, M.J., Shead, N.W., Olson, J.M., 2011. Personal relative deprivation, delay discounting, and gambling. J. Personal. Soc. Psychol. 101 (5), 955–973.

Carleton, R.N., Thibodeau, M.A., Teale, M.J., Welch, P.G., Abrams, M.P., Robinson, T., Asmundson, G.J., 2013. The center for epidemiologic studies depression scale: a review with a theoretical and empirical examination of item content and factor structure. PloS one 8 (3), e58067.

Cattarin, J.A., Thompson, J.K., Thomas, C., Williams, R., 2000. Body image, mood, and televised images of attractiveness: the role of social comparison. J. Soc. Clin. Psychol. 19 (2), 220–239.

Chandler, J., Shapiro, D., 2016. Conducting clinical research using crowdsourced convenience samples. Annu. Rev. Clin. Psychol. 12, 53—81.

Clark, D.A., Beck, A.T., 1999. Scientific Foundations of Cognitive Theory and Therapy of Depression. John Wiley & Sons, New York, NY.

Demakakos, P., Nazroo, J., Breeze, E., Marmot, M., 2008. Socioeconomic status and health: the role of subjective social status. Soc. Sci. Med. 67 (2), 330—340.

De Winter, J.C.F., Kyriakidis, M., Dodou, D., Happee, R., 2015. Using CrowdFlower to study the relationship between self-reported violations and traffic accidents. Procedia Manuf. 3, 2518—2525.

Dobson, K.S., Dozois, D.J.A. (Eds.), 2008. Risk Factors in Depression. Academic Press, San Diego, California.

Dozois, D.J., Beck, A.T., 2008. Cognitive schemas, beliefs and assumptions. Risk Factors depress. 1, 121—143.

Franzini, L., Fernandez-Esquer, M.E., 2006. The association of subjective social status and health in low-income Mexican-origin individuals in Texas. Soc. Sci. Med. 63 (3), 788—804.

Furnham, A., Brewin, C.R., 1988. Social comparison and depression. J. Genet. Psychol. 149 (2), 191—198.

Gibbons, F.X., Gerrard, M., 1989. Effects of upward and downward social comparison on mood states. J. Soc. Clin. Psychol. 8 (1), 14—31.

Gross, J.J., 2013. Emotion regulation: taking stock and moving forward. Emotion 13 (3), 359—365.

Gross, J.J., John, O.P., 2003. Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. J. Personal. Soc. Psychol. 85 (2), 348.

Hayes, A.F., 2013. Introduction to Mediation, Moderation, and Conditional Process Analysis: a Regression-based Approach. Guilford Press, New York, NY.

Hammen, C., 2005. Stress and depression. Annu. Rev. Clin. Psychol. 1, 293—319.

Harkness, K.L., Monroe, S.M., 2006. Severe melancholic depression is more vulnerable than non-melancholic depression to minor precipitating life events. J. Affect. Disord. 91 (2), 257—263.

Henry, J.D., Crawford, J.R., 2005. The short-form version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. Br. J. Clin. Psychol. 44 (2), 227—239.

Hollon, S.D., Kendall, P.C., 1980. Cognitive self-statements in depression: development of an automatic thoughts questionnaire. Cognitive Ther. Res. 4 (4), 383—395.

Ingram, R.E., Miranda, J., Segal, Z.V., 1998. Cognitive Vulnerability to Depression. Guilford Press, New York.

Jones, D.C., 2001. Social comparison and body image: attractiveness comparisons to models and peers among adolescent girls and boys. Sex roles 45 (9—10), 645—664.

Jones, A.M., Wildman, J., 2008. Health, income and relative deprivation: evidence from the BHPS. J. health Econ. 27 (2), 308—324.

Kessler, R.C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K.R., et al., 2003. The epidemiology of major depressive disorder: results from the National Co-morbidity Survey Replication (NCS-R). JAMA 289 (23), 3095—3105.

Kessler, R.C., Bromet, E.J., 2013. The epidemiology of depression across cultures. Annu. Rev. Public Health 34, 119—138.

Kroenke, K., Strine, T.W., Spitzer, R.L., Williams, J.B., Berry, J.T., Mokdad, A.H., 2009. The PHQ-8 as a measure of current depression in the general population. J. Affect. Disord. 114 (1), 163—173.

Kwon, S.-M., Oei, T.P., 1992. Differential causal roles of dysfunctional attitudes and automatic thoughts in depression. Cognitive Ther. Res. 16 (3), 309—328.

Le, J., Edmonds, A., Hester, V., Biewald, L., 2010. Ensuring Quality in Crowdsourced Search Relevance Evaluation: the Effects of Training Question Distribution. Paper presented at the SIGIR 2010 workshop on crowdsourcing for search evaluation.

Mazza, J.J., Reynolds, W.M., 1998. A longitudinal investigation of depression, hopelessness, social support, and major and minor life events and their relation to suicidal ideation in adolescents. Suicide Life-Threatening Behav. 28 (4), 358—374.

Mishra, S., Carleton, R.N., 2015. Subjective relative deprivation is associated with poorer physical and mental health. Soc. Sci. Med. 147, 144—149.

Mishra, S., Novakowski, D., 2016. Personal relative deprivation and risk: an examination of individual differences in personality, attitudes, and behavioral outcomes. Personal. Individ. Differ. 90, 22—26.

Morris, R., Carstairs, V., 1991. Which deprivation? A comparison of selected deprivation indexes. J. Public Health 13 (4), 318—326.

Muramatsu, N., 2003. County-level income inequality and depression among older Americans. Health Serv. Res. 38, 1863—1884.

Pabayo, R., Kawachi, I., Gilman, S.E., 2013. Income inequality among American states and the incidence of major depression. J. Epidemiol. Community Health 68 (2), 110—115.

Pickett, K.E., Wilkinson, R.G., 2006. Income inequality and the prevalence of mental illness: a preliminary international analysis. J. Epidemiol. Community Health 60, 646—647.

Pickett, K.E., Wilkinson, R.G., 2010. Inequality: an under acknowledged source of mental illness and distress. Br. J. Psychiatry 197, 426—428.

Pickett, K.E., Wilkinson, R.G., 2015. Income inequality and health: a causal review. Soc. Sci. Med. 128, 316—326.

Power, M.J., Katz, R., McGuffin, P., Duggan, C.F., Lam, D., Beck, A.T., 1994. The Dysfunctional Attitude Scale (DAS): a comparison of forms A and B and proposals for a new subscaled version. J. Res. Personal. 28 (3), 263—276.

Preacher, K.J., Kelley, K., 2011. Effect size measures for mediation models: quantitative strategies for communicating indirect effects. Psychol. methods 16 (2), 93—115.

Radloff, L.S., 1977. The CES-D scale a self-report depression scale for research in the general population. Appl. Psychol. Meas. 1 (3), 385—401.

Rumpf, H.-J., Meyer, C., Hapke, U., John, U., 2001. Screening for mental health: validity of the MHI-5 using DSM-IV Axis I psychiatric disorders as gold standard. Psychiatry Res. 105 (3), 243—253.

Runciman, W.G., 1966. Relative Deprivation and Social Justice: a Study of the Attitudes to Social Inequality in 20th Century England. University of California Press, Berkeley.

Smith, H.J., Huo, Y.J., 2014. Relative deprivation how subjective experiences o inequality influence social behavior and health. Policy Insights Behav. Brain Sci. 1 (1), 231—238.

Smith, H.J., Pettigrew, T.F., Pippin, G.M., Bialosiewicz, S., 2012. Relative deprivation a theoretical and meta-analytic review. Personal. Soc. Psychol. Rev. 16 (3), 203—232.

Subramanian, S.V., Kawachi, I., 2004. Income inequality and health: what have we learned so far? Epidemiol. Rev. 26 (1), 78—91.

Suls, J., Martin, R., Wheeler, L., 2002. Social comparison: why, with whom, and with what effect? Curr. Dir. Psychol. Sci. 11 (5), 159—163.

Üstün, T., Ayuso-Mateos, J.L., Chatterji, S., Mathers, C., Murray, C.J., 2004. Global burden of depressive disorders in the year 2000. Br. J. Psychiatry 184 (5), 386—392.

Weissman, A.N., Beck, A.T., 1978, November. Development and Validation of the Dysfunctional Attitude Scale: a Preliminary Investigation (Paper presented at the meeting of the Association for the Advancement of Behavior Therapy, Chicago).

Wilkinson, R.G., Pickett, K.E., 2006. Income inequality and population health: a review and explanation of the evidence. Soc. Sci. Med. 62 (7), 1768—1784.

Wilkinson, R.G., Pickett, K.E., 2007. The problems of relative deprivation: why some societies do better than others. Soc. Sci. Med. 65 (9), 1965—1978.

Wilkinson, R.G., Pickett, K.E., 2009. Income inequality and social dysfunction. Annu. Rev. Sociol. 493—511.

Yitzhaki, S., 1979. Relative deprivation and the Gini coefficient. Q. J. Econ. 321—324.

Yngwe, M.Å., Fritzell, J., Lundberg, O., Diderichsen, F., Burström, B., 2003. Exploring relative deprivation: is social comparison a mechanism in the relation between income and health? Soc. Sci. Med. 57 (8), 1463—1473.