Uncertainty Breeds Anxiety and Depression: The Impact of the Russian Invasion in Ukraine on a Swedish Clinical Population Receiving Internet-Based Psychotherapy

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Recent global crises, such as the COVID-19 pandemic and the 2022 Russian invasion of Ukraine, have contributed to a rise in the global prevalence of anxiety and depressive disorders. This study examined the indirect impact of the Ukraine war on emotional disorders within a Swedish clinical population \((n = 1222)\) participating in an internet-based psychotherapeutic intervention (cognitive-behavioral, psychodynamic, waitlist). We hypothesized that the severity of anxiety and depressive symptoms would increase immediately after the war's onset. The Patient Health Questionnaire 9-item scale and the Generalized Anxiety Disorder 7-item scale were used to measure depression and anxiety. Results indicated that anxiety and depressive symptom severity increased following the war's onset, with an average weekly increase of 0.77-points for anxiety and 0.09-points for depression; however, the increase was not statistically significant for depression. Furthermore, higher socioeconomic status predicted declines in depression and anxiety over the course of treatment, with a 0.69-point average weekly decrease in anxiety and a 1.09-point average weekly decrease in depression, per one unit's increase in socioeconomic status. Finally, treatment efficacy for anxiety and depression was high, with average weekly symptom reductions of 0.12-points for anxiety and 0.15-points for depression. These findings have implications for mitigating the development of psychopathology during crises, interpreting treatment efficacy during such events, and emphasizing the potential of internet-based psychotherapy for addressing emotional disorders during crises. To the best of our knowledge, this is the first internet-based semi-longitudinal study investigating the effects of the war in Ukraine on emotional disorders in a clinical population.

In recent years, the world has faced numerous global crises with devastating consequences for mental health. For instance, depression prevalence rose significantly in response to the 2008 global financial crisis (Guerra & Eboreime, 2021), and global prevalence rates of anxiety and depression increased by roughly 25% during the COVID-19 pandemic (Ettman et al., 2020; World Health Organization, 2022). Similarly, the Russian invasion of Ukraine on February 24th, 2022, resulted in increased prevalence rates of anxiety and depression among Ukrainians (Osokina et al., 2022; Xu et al., 2023) and Europeans (Riad et al., 2022; Skwirczyńska et al., 2022). Although these crises differ, they share a common characteristic: an increase in uncertainty.

Effectively managing uncertainty is a critical adaptive challenge for humans. However, when environmental uncertainty abruptly increases, as during a global pandemic or a war outbreak, our capacity for adaptive information processing becomes hindered by internal disorder and internal uncertainty (i.e., external uncertainty leads to internal uncertainty). These features, known as psychological entropy (Hirsh et al., 2012), tend to increase in the wake of uncertainty-inducing events, in turn raising the likelihood of psychopathological development.
According to the entropy model of uncertainty, psychological entropy results from increased uncertainty about one's perceptions and behavioral affordances. For instance, entropy levels are low in personally familiar circumstances because one's perceptions and behavioral affordances are unambiguous. In contrast, entropy levels are high in unfamiliar circumstances due to perceptual vagueness and behavioral ambiguity. Put differently, entropy levels rise concomitantly with decreasing perceptual accuracy for discerning what outcome will result from any given behavioral action. As such, psychological entropy can be viewed as an indicator of the degree to which thoughts and emotions are disordered, unpredictable, and challenging, which thus heightens behavioral inhibition (Hirsh et al., 2012; see also Gray & McNaughton, 2000).

Psychological entropy tends to increase in response to uncertainty-inducing events like crises. This, in turn, increases the probability of developing dysfunctional or maladaptive cognitive-perceptual and behavioral patterns, which thus impair daily functioning and raise the likelihood of psychopathology. For instance, the prevalence of anxiety and depressive disorders was significantly higher during the COVID-19 pandemic compared to pre-pandemic rates (Gao et al., 2020; Xiong et al., 2020), with worldwide prevalence rising by 25% (Ettman et al., 2020; World Health Organization, 2022) and pandemic-related media exposure increasing the odds of presenting with anxiety and combined anxiety and depression (i.e., simultaneous anxiety and depressive symptoms; Gao et al., 2020).

Similarly, economic recessions (e.g., the 2008 global financial crisis) are associated with an overall increase in depression prevalence, where low education, job insecurity, and low pre-recession socioeconomic status routinely emerge as risk factors (Frasquilho et al., 2016; Gili et al., 2013; Guerra & Eboreime, 2021). Anxiety prevalence also increases during recessions, although the working class appears more sensitive and prone to present with anxiety symptoms in the wake of a recession (Guerra & Eboreime, 2021). In general, sudden drops in household income following economic recessions are associated with a higher probability of developing mental disorders (Sareen et al., 2011), and taken together, individuals with below-average socioeconomic status are of a disproportionate risk for psychopathology in response to economic recessions (cf. entropy increase).

Expanding the findings above, armed conflicts and full-blown war outbreaks proliferate mental health problems and have wide-ranging implications. For instance, a recent meta-analysis showed that individuals affected by armed conflicts have substantially higher prevalence rates of anxiety, depression, and posttraumatic stress disorder during war conflicts compared to post-war prevalence rates (Lim et al., 2022). However, risk factors for psychopathology in response to war outbreaks may have different trajectories, where direct exposure to war conflicts preferentially predicts increased anxiety, while low socioeconomic status preferentially predicts increased depression (Kohrt et al., 2012). Relatedly, the prevalence rates of emotional disorders among long-settled war refugees are disproportionately higher than in general non-war-affected populations, where poor socioeconomic circumstances post-migration predict depression (Bogic et al., 2015).

Implicating the recent outbreak of a full-blown war in Ukraine directly\(^1\), Karatzias et al. (2023) found a dose-dependent relationship between experiencing war-related stressors and both posttraumatic stress disorder and complex posttraumatic stress disorder in a nationwide Ukrainian sample six months after Russia's invasion. Although anxiety and depressive

\(^1\) It should be noted that a Russian–Ukrainian conflict began in 2014 but escalated into the full-blown outbreak of war in February 2022, following Russia’s invasion into Ukraine (cf. Michailova, 2022).
disorders were not assessed in their study, the results suggested that a vast majority of participants had experienced threats to their personal safety and financial security. As noted above, psychological entropy hazards the possibility of psychopathological development (Hirsh et al., 2012) and financial insecurity is a risk factor for developing emotional disorders (e.g., Guerra & Eboreime, 2021). Moreover, intolerance of uncertainty is a core feature of both anxiety and depressive disorders (American Psychiatric Association, 2022; Harmon-Jones, 2004; Jensen et al., 2016; Sauer-Zavala & Barlow, 2021), and thus increased prevalence of these disorders is a logical derivation from Karatzias et al.’s (2023) results.

Indeed, Xu et al. (2023) found that the prevalence rates of anxiety and depression in the general Ukrainian population increased more than twofold after the Russian invasion compared to prevalence rates reported in 2016. Similarly, Osokina et al. (2022) assessed the impact of the Russian invasion on mental health problems among adolescents living in war-torn and peaceful regions of Ukraine. Their result indicated that residence in a war-torn region was associated with significantly higher point prevalence rates for measures of anxiety, depression, and posttraumatic stress disorder, even after adjusting for risk factors such as socioeconomic status; both direct and indirect war experiences predicted mental health problems in both regions (Osokina et al., 2022). Their analysis not only corroborates previous findings on the augmentation of psychopathological problems following severe crises (e.g., Gao et al., 2020; Guerra & Eboreime, 2021) but also indicates that indirect non-violent experiences of war can, and do, proliferate the prevalence of mental disorders (see also Jayuphan et al., 2020).

The effects of the war in Ukraine are felt worldwide. For instance, people across North Atlantic Treaty Organization (NATO) member states reported increased feelings of threat, anxiety, and anger in response to the Russian invasion (Moshagen & Hilbig, 2022). Indeed, a recent study by RiaD et al. (2022) found that Czech university students reported higher levels of concern about the ongoing conflict, where increased age correlated with higher levels of concern and media exposure engagement predicted both anxiety and depression severity; individuals who frequently checked the news every couple of hours presented with the highest indices of anxiety and depression. Furthermore, Skwirczyńska et al. (2022) discovered a positive association between war-related fear and anxiety severity in a Polish student sample. Intriguingly, access to monetary savings emerged as a protective factor that reduced the odds of presenting anxiety symptoms. One interpretation of Skwirczyńska et al.’s (2022) findings is that socioeconomic status, as indicated by access to monetary savings, buffers against anxiety symptom development (cf. Guerra & Eboreime, 2021). In summary, the war outbreak in Ukraine has had noticeable effects on the European population.

**Emotional Disorders**

Anxiety and depressive disorders are encompassed within the broad category of emotional disorders. Emotional disorders are characterized by frequent experiences of negative emotions coupled with maladaptive reactions to and regulation of such experiences which, in turn, increase the probability of future negative emotions and maintain the presenting disorder symptomology (cf. negative feedback loop; Bullis et al., 2019). Recently, researchers and clinicians (e.g., DeYoung, 2015; Sauer-Zavala & Barlow, 2021) have increasingly associated the core features of emotional disorders with the higher-order personality trait neuroticism. For instance, Sauer-Zavala and Barlow (2021) associate high levels of neuroticism with an increased propensity for negative emotional experiences, greater proneness to finding such experiences aversive and, in turn, engagement in behavioral escape or avoidance strategies (cf. Bullis et al., 2019). As such, neuroticism is considered a risk factor for psychopathology.
Neuroticism as a risk factor is reflected in Barlow's triple vulnerability theory (see Sauer-Zavala & Barlow, 2021), wherein three separate interacting diatheses depict the sequential development of emotional disorders: (1) A generalized genetic vulnerability (i.e., neuroticism) sets the stage for (2) a learned generalized psychological vulnerability (i.e., contending with uncontrollable and unpredictable life events, particularly in early development), culminating with (3) a learned specific psychological vulnerability (cf. social-cognitive vulnerabilities, also called clinical traits; Naragon-Gainey & Watson, 2018) that accounts for individual differences in the emergent emotional disorder. According to this theory, the two generalized vulnerabilities dynamically contribute to the development and expression of trait neuroticism, and thus function as risk factors for the later development of an emotional disorder. Indeed, Naragon-Gainey and Watson (2018) suggest that the specific psychological vulnerabilities outlined in Barlow's triple vulnerability theory can most accurately be conceptualized as specific manifestations of higher-order trait neuroticism. For example, against the backdrop of neuroticism, sadness experienced following the loss of a loved one can evolve into a depressive disorder, while uncomfortable somatic sensations can evolve into an illness anxiety disorder (cf. specific psychological vulnerabilities). Taken together, ample evidence supports the notion that a neurotic temperament is a characteristic quality that is common across the broad category of emotional disorders, where specific psychological vulnerabilities account for phenotypic differences between discrete diagnoses (Barlow, Farchione, Bullis, et al., 2017; Bullis et al., 2019; Sauer-Zavala et al., 2017; Sauer-Zavala & Barlow, 2021).

Indeed, neuroticism has emerged as a robust predictor of psychopathology in general (Lahey, 2009) and emotional disorders more specifically (Barlow, Farchione, Bullis, et al., 2017; Bullis et al., 2019; Sauer-Zavala & Barlow, 2021). For instance, a greater proportion of females experience anxiety and depressive disorder symptoms than do males, but these gender differences are significantly mediated by trait neuroticism (Leach et al., 2008). Furthermore, a neurotic temperament predicts both comorbid presentations of emotional disorders and treatment-seeking behavior (see Sauer-Zavala & Barlow, 2021). Moreover, treatment-seeking individuals frequently present with concurrent anxiety and depressive symptoms which, in turn, substantiates the notion that a superordinate higher-order trait influences both disorders. For instance, individuals seeking treatment for depression routinely meet diagnostic criteria for at least one comorbid anxiety disorder (i.e., approximately 25-67% of patients), and individuals seeking treatment for anxiety disorders likewise routinely meet diagnostic criteria for a comorbid depressive disorder (i.e., approximately 30-63% of patients; Choi et al., 2020). This high comorbidity may be due to shared variance in emotional disorders being attributable to neuroticism (Barlow, Farchione, Bullis, et al., 2017; Bullis et al., 2019; Jensen et al., 2016; McEvoy et al., 2019; Sauer-Zavala & Barlow, 2021). Indeed, decreased neuroticism scores cooccur with decreased anxiety and depressive symptoms (Sauer-Zavala et al., 2017).

Some evidence suggests that presenting anxiety disorder symptoms temporarily precedes the development of a depressive disorder (cf. temporal hypothesis of emotional disorders). For instance, findings from a recent large scale meta-analytic provide support for the notion that anxiety disorders have, on average, an earlier age of onset than depressive disorders (Solmi et al., 2022; see also Sauer-Zavala & Barlow, 2021). Furthermore, the frequency of patients presenting with depression symptoms without also presenting with anxiety symptoms is estimated to be 5% (Sauer-Zavala & Barlow, 2021). Moreover, there is ample evidence in support of the notion that neuroticism influences the development of anxiety disorders to a greater degree than in depression. For example, intolerance of uncertainty (i.e., a specific psychological vulnerability that is defined as the general tendency to respond to uncertainty with discomfort and anxiety; Naragon-Gainey & Watson, 2018) appears to be more
pronounced in anxiety disorders than depression (Jensen et al., 2016). This finding can readily be understood when juxtaposed with the definition of anxiety. Specifically, the American Psychiatric Association (2022, p. 215) defines anxiety as the "anticipation of [a] future threat," and threats signify the probability of negative consequences in the future (cf. entropy increase; Hirsh et al., 2012; Jensen et al., 2016). Indeed, anxiety can be construed as the phenomenological manifestation of psychological entropy (cf. internal disorder and uncertainty) that arises following uncertainty-inducing events (Hirsh et al., 2012).

In contrast to anxiety, depression is distinguished by a greater sense of certainty and encompasses negative beliefs about oneself, the world, and the future (Beck, 1976). These beliefs comprise the domains typically associated with the cognitive triad and align closely with the definition of neuroticism; that is, the essential components of a neurotic temperament include conceiving of the world as a dangerous and unpredictable place, coupled with the belief of not being able to cope with challenges that may arise (Sauer-Zavala & Barlow, 2021). Furthermore, evidence suggests that ruminative thoughts within the domains encapsulated in the cognitive triad heighten an individual's intolerance of uncertainty and in turn, maintain elevated levels of neuroticism (Jensen et al., 2016; McEvoy et al., 2019). Moreover, when neuroticism is broken down into its aspects (i.e., volatility and withdrawal; cf. DeYoung et al., 2007), high scores on the withdrawal aspect; which involves susceptibility to depression, behavioral inhibition, and heightened sensitivity to uncertainty and errors (DeYoung, 2015); are associated with an elevated risk for engaging in ruminative thoughts about past and future experiences (DeYoung, 2015; Harmon-Jones, 2004).

Building on this, both ruminative and worry-laden thoughts can be collapsed under the broader concept of repetitive negative thinking (Sauer-Zavala & Barlow, 2021). Repetitive negative thinking has been shown to be a central transdiagnostic component for both anxiety and depressive disorders, where repetitive worry-laden thoughts typify anxiety disorders and ruminative thoughts typify depressive disorders (Everaert & Joormann, 2019). Negative repetitive thinking may function as a cognitive avoidance strategy (i.e., intentional down-regulation of negative emotions and their associated sense of uncontrollability via avoidant behavior; also called avoidance coping). Avoidance coping is characterized by passively focusing on surface matters to protect against more fundamentally distressing affect-laden concerns. However, although avoidance coping temporarily provides relief from negative emotional experiences, it also increases the frequency of such experiences in the long run which, in turn, maintains emotional disorder symptom presentations (Bullis et al., 2019; Sauer-Zavala & Barlow, 2021).

In summary, there is ample evidence in support of the notion that the communality across emotional disorders can largely be explained through the higher-order trait neuroticism. Furthermore, avoidance coping mechanisms that temporarily relief individuals from aversive reactions toward their negative emotional experiences (e.g., repetitive negative thinking strategies such as rumination and worry), paradoxically maintain emotional disorder symptoms in the long run. Taken together, repetitive negative thinking and avoidance coping strategies, coupled with the temporal hypothesis and cognitive triad noted above, elucidate the conceptual intersection between anxiety and depressive disorders and neuroticism (see Bullis et al., 2019; Sauer-Zavala & Barlow, 2021).

**Psychotherapeutic Interventions**
As a result of the overlap of symptom presentation across emotional disorders, transdiagnostic treatment intervention protocols have rapidly increased in popularity in recent years (see
Within such protocols, a transdiagnostic treatment aims to target the commonalities across emotional disorders such as anxiety sensitivity, experiential avoidance, distress intolerance, and intolerance of uncertainty, which all relate to the tendency to find emotional experiences aversive (cf. Naragon-Gainey & Watson, 2018). A recent randomized control trial comparing a transdiagnostic emotional disorder treatment intervention with gold-standard, symptom-focused protocols and waitlists provides empirical support for transdiagnostically-focused interventions. It revealed that a transdiagnostic intervention was associated with significantly greater reductions of emotional disorder symptoms (cf. neuroticism) compared to symptom-focused protocols, even when controlling for fluctuations in average levels of anxiety and depressive symptoms over the course of treatment (Sauer-Zavala et al., 2021).

**Unified Protocol**

The Unified Protocol (UP) for transdiagnostic treatment of emotional disorders is a cognitive-behavioral treatment intervention focused on ameliorating the underlying emotional reactivity and dysregulation (cf. neuroticism) that is common across emotional disorders (Barlow, Farchione, Sauer-Zavala, et al., 2017; see also Sauer-Zavala et al., 2017). To that aim, aversive and avoidant reactions to emotions are targeted in the UP, as although such reactions provide short-term relief, they increase the likelihood of future negative emotions and maintain disorder symptoms. As such, UP is an emotion-focused treatment approach, wherein patients are taught to confront and experience uncomfortable emotional experiences and respond to them adaptively (Barlow, Farchione, Sauer-Zavala, et al., 2017).

The UP consists of five core components that aim to facilitate participants' ability to react advantageously to thoughts and feelings that impair their daily functioning. Those components are 1) mindfulness, 2) cognitive flexibility, 3) identification and subsequent reduction of behavioral avoidance, 4) increased awareness and tolerance of experiencing physiological sensations, and 5) voluntary exposure to introspective and situational emotionally-laden experiences (Barlow, Farchione, Sauer-Zavala, et al., 2017). In turn, increased mastery over the contents of these components arms participants with new tools that bolster their ability to adaptively react to maladaptive beliefs, dysfunctional thoughts, and combat avoidance behaviors following aversive emotional experiences.

**Affect Phobia (AP) Therapy**

The affect phobia (AP) therapy model is a transdiagnostic short-term psychodynamic treatment intervention, cast in a behavioral framework. AP therapy aims to facilitate a participant's intellectual and emotional understanding of their problems (Julien & O’Connor, 2017). According to the AP model, affects are construed as the primary drivers of behavior and change; maladaptive affects (e.g., anxiety/terror, shame/humiliation) impede adaptive affects (e.g., sadness/grief, closeness/tenderness), in turn resulting in an internal affect-conflict. An avoidance, prevention, or diminishment of such affect-conflicts through defensive behavior (e.g., masking grief with disproportionate and inappropriate overt displays of happiness), in turn, maintains the internal conflict state and leads to the development of psychopathological disorders. In other words, psychopathological symptoms are viewed as the overt manifestation of internal affect-conflicts, maintained by preferentially engaging in affective avoidance (Julien & O’Connor, 2017).

As a result of affective avoidance being the maintaining factor of psychopathology in the model, an AP treatment intervention is directed at decreasing affective avoidance, supporting
participants to approach their emotional states voluntarily, and increasing emotional awareness. To that aim, participants are taught to associate their psychopathological symptoms with their affective avoidance and encouraged to observe frequent and maladaptive relational patterns that accompany affective avoidance. In other words, an AP treatment intervention seeks to reconstrue psychopathological states through exposure and response prevention (Julien & O’Connor, 2017).

Internet-Based Therapy

In recent years, a disparity has emerged between the demand for psychotherapy and its availability. As a result, the utilization of internet-based psychotherapeutic interventions has risen substantially in an effort to address this discrepancy (Andersson et al., 2019). Internet-based psychotherapeutic treatment interventions leverage technological advancements to create a contemporary alternative to traditional therapy. Typically, internet-based therapy consists of structured, manualized psychotherapy delivered online through modules containing self-help texts and the option to communicate with a therapist via encrypted messages (Andersson & Carlbring, 2022). Designed to parallel conventional face-to-face therapy in length and content (Andersson et al., 2016), internet-based therapy demonstrates equivalent overall therapeutic efficacy (Hedman-Lagerlöf et al., 2023). Meta-analytic findings support the treatment efficacy of internet-based therapy for emotional disorders, revealing moderate to large effect sizes for anxiety and depressive disorders (Andersson et al., 2019; Hedman-Lagerlöf et al., 2023).

Moreover, recent meta-analyses have revealed age-related differences in treatment efficacy as well as differential treatment efficacy for individuals with varying levels of educational attainment. For instance, higher age has been shown to act as a protective factor against mental health deterioration among patients receiving internet-based psychotherapeutic interventions, with lower age predicting greater deterioration (Rozental et al., 2017). Similarly, patients with lower levels of educational attainment have a significantly higher risk for deterioration compared to those with more education (Ebert et al., 2016). As such, it is appropriate to statistically adjust for age and education level in analyses that aim to partial out estimations of treatment efficacy and, thus, any effects of sudden uncertainty-inducing events such as a war outbreak.

Previous studies have successfully translated UP and AP interventions for provision via the internet. For instance, recent findings indicate that there is a comparable efficacy between an internet-based UP and face-to-face UP interventions and have even suggested that UP delivered via the internet may be better posed to effectively address comorbidities in anxiety and depressive disorders (Schaeuffele et al., 2022). Similarly, studies on the translation of AP therapy to an online setting have shown the model to be successfully translatable with good efficacy to an internet-based treatment option for anxiety and depression (Johansson et al., 2013, 2017).

Aim of the Present Study

The present study aims to assess the effects of indirect experiences of the war outbreak in Ukraine on anxiety and depression severity among individuals undergoing an internet-based treatment intervention in a neighboring, but not a bordering, country (i.e., approximately 1500 kilometers separate Sweden and Ukraine). Although this study is conducted in Sweden, previous studies suggest that the war outbreak in Ukraine increased point prevalence rates of anxiety and depression in the general European population (Riad et al., 2022; Skwirczyńska et al., 2022). Indeed, surges in indirect exposure to and experiences of psychological threats
(e.g., media exposure of crisis-related content) do appear to jeopardize individuals' sense of personal security and exacerbate psychopathological development (Gao et al., 2020; Jayuphan et al., 2020; Riad et al., 2022). Consequently, we predicted a divergence in weekly therapeutic efficacy trends among individuals undergoing an internet-based treatment intervention for emotional disorder(s) following the war outbreak, as indicated by a spike in measures of anxiety and depression. To the best of our knowledge, this is the first study investigating the effects of the war in Ukraine on emotional disorders in a clinical population. Information about the effects of environmental crises on therapeutic outcomes can inform differential treatment effectiveness during times of heightened environmental uncertainty and partial out the effects of treatment from the effects of entropy increase.

**Hypotheses**
This study has two core hypotheses: Scores on the 1) PHQ-9 and 2) GAD-7 are significantly higher following the outbreak of war in Ukraine than expected based on the trend in scores from the previous 4-week period, adjusting for treatment group assignment, socioeconomic status, education level, age, and gender. In other words, indicators of anxiety and depression – adjusted for treatment group assignment, socioeconomic status, education level, age, and gender – significantly increase following the outbreak of war. Furthermore, socioeconomic status is hypothesized to be a protective factor that buffers against further development of psychopathology following the war outbreak. Finally, treatment efficacy during the study's time course will be explored.

**Method**

**Participants and Recruitment**
The present study (ClinicalTrials.gov identifier: NCT05016843) was conducted in Sweden and is part of an ongoing clinical trial (Mechler et al., 2022): The Study of Internet-delivered, Transdiagnostic Treatments for Anxiety and Depression ("TRAnsdiagnostisk BEhandling [Elektronisk]"). Participants were recruited online through a secure online platform that outlined the study's aims and components (Vlaescu et al., 2016). The study was advertised on Facebook and also spread through word of mouth.

**Sample Size**
All participants (n = 1222) actively engaged in the study between January 24th, 2022, and March 24th, 2022, were included in the current analysis (i.e., both treatment-seeking and waitlisted). These two months were selected to adequately represent the treatment efficacy before and after the outbreak of war in Ukraine on February 24th, 2022.

**Eligibility Criteria**
Eligibility criteria were assessed during the study's screening phase. Participants were required to: a) be at least 18 years of age; b) read and write in Swedish; c) have an internet connection via their mobile phone or computer; and d) experience at least mild anxiety symptoms (i.e., GAD-7 ≥ 5 points) or mild to moderate depression symptoms (i.e., PHQ-9 ≥ 10 points), or both. Participants were excluded if they: a) were currently seeking other psychological treatment; b) had begun or adjusted psychopharmacological treatment for anxiety, worry, or depression within the nearest month from screening; or c) had severe depression (i.e., PHQ-9 ≥ 20 points) or suicidality (i.e., PHQ-9, item nine score > 2 points) indicated during screening.

2 https://www.iterapi.se/sites/trabee/
Measures
Demographic variables and anxiety and depression measurements were collected during screening, followed by weekly measurements of anxiety and depression, and ending with a post-assessment measurement of anxiety and depression.

Demographics
Demographic variables gathered during screening included age, gender, socioeconomic status\(^3\), marital status, household composition, level of education, employment status, mental health characteristics, and prior psychopharmaceutical medication usage.

Patient Health Questionnaire 9-item scale (PHQ-9)
The Patient Health Questionnaire 9-item scale (PHQ-9) is a self-report questionnaire that quantifies depression severity (Kroenke et al., 2001). Each item (e.g., "little interest or pleasure in doing things") is rated on a scale from 0 (i.e., "not at all") to 3 (i.e., "nearly every day"), with total scores ranging from 0 to 27. A score of 10 or higher is a diagnostic indicator of depression (Kroenke et al., 2001, 2010). The PHQ-9 consistently demonstrates good accuracy and discrimination ability in clinical settings and the general population (Kocalevent et al., 2013; Kroenke et al., 2001, 2010) as well as when administered via the internet (Martin-Key et al., 2022). In this study, the PHQ-9 exhibited adequate internal reliability during screening, Cronbach's alpha = 0.66 [95% CI: 0.63, 0.68], and suitable reliability during post-intervention, Cronbach's alpha = 0.87 [95% CI: 0.86, 0.88], indicating acceptable internal consistency overall.

Generalized Anxiety Disorder 7-item scale (GAD-7)
The Generalized Anxiety Disorder 7-item scale (GAD-7) is a self-report questionnaire that assesses anxiety and screens for generalized anxiety disorder (Spitzer et al., 2006). Each item (e.g., "feeling nervous, anxious, or on edge") is rated on a scale from 0 (i.e., "not at all") to 3 (i.e., "nearly every day"), with total scores ranging from 0 to 21. A score of 8 or higher is a diagnostic indicator of an anxiety disorder (Luo et al., 2019; Spitzer et al., 2006). The items align with DSM-5 criteria (American Psychiatric Association, 2022) and are sensitive to various anxiety disorders (Kroenke et al., 2010) in both clinical settings and the general population, as well as when administered online (Byrd-Bredbenner et al., 2021; Johnson et al., 2019; Löwe et al., 2008; Martin-Key et al., 2022). In this study, the GAD-7 demonstrated good internal reliability during screening, Cronbach's alpha = 0.77 [95% CI: 0.75, 0.79], and during post-intervention, Cronbach's alpha = 0.87 [95% CI: 0.86, 0.88], indicating excellent internal consistency.

Treatment Interventions
Data was part of an ongoing clinical trial (Carlbring, 2023; Mechler et al., 2022) comparing cognitive-behavioral therapy (UP; Barlow et al., 2017) with psychodynamic affective phobia (AP) therapy (Julien & O’Connor, 2017). The trial comprised three factors: a) type of internet-based treatment intervention; b) treatment length; and c) effects of access to a clinician-moderated discussion forum. Participants were randomly assigned via a factorial assignment mechanism to one of twelve conditions: UP, AP, or a waitlist, each for either 8 or 16 weeks, and each with or without access to a clinician-moderated discussion forum. Following the Russian invasion of Ukraine, a decision to also analyze the potential effects of a war outbreak on emotional disorders among Swedish treatment-seeking individuals was

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\(^3\) Socioeconomic status indirectly measured with a self-rated scale; participants rated their socioeconomic status in relation to others on a scale from 1 to 5 (see Table 1 for response options).
made. This study only intends to assess possible effects of the Russian invasion of Ukraine in a Swedish clinical population. What follows describes the study's initial procedure.

**Unified Protocol (UP)**

UP was delivered through a secure online platform. Participants receiving UP gained access to a new treatment module every week that consisted of a text relating to one of the five core components of UP. In turn, participants were free to engage with material from the modules whenever doing so suited them best. Participants were assigned to receive a UP treatment intervention for either 8 or 16 weeks. Furthermore, participants were either assigned access to a clinician-moderated discussion forum, or their treatment was self-guided (i.e., no access to a clinician-moderated forum). Participants with access to a clinician-moderated forum were encouraged to discuss treatment-related questions and experiences.

**Affect Phobia (AP) Therapy**

AP therapy was delivered through a secure online platform. Participants receiving AP therapy gained access to a new treatment module every week that consisted of a text relating to the reconstruction of defensive behaviors (cf. response prevention), affects (cf. exposure), sense of self, and sense of others (Julien & O’Connor, 2017). In turn, participants were free to engage with material from the modules whenever doing so suited them best. Participants were assigned to AP therapy for either 8 or 16 weeks. Furthermore, participants were either assigned access to a clinician-moderated discussion forum, or their treatment was self-guided (i.e., no access to a clinician-moderated forum). Participants with access to a clinician-moderated forum were encouraged to discuss treatment-related questions and experiences.

**Waitlist**

The waitlist condition constituted a control condition without any active intervention protocol. Participants were assigned to the waitlist condition for either 8 or 16 weeks. Furthermore, participants in the waitlist condition were either assigned access or no access to a clinician-moderated discussion forum during the assigned duration. Participants assigned access to a clinician-moderated forum were encouraged to discuss questions and experiences related to their condition. Since all participants were treatment-seeking, waitlisted participants are also part of the clinical population under examination in the present study.

**Ethical Considerations**

The present study was initially approved in 2021 by the Swedish Ethical Review Authority (Dnr 2021-00034 [SU308-0002-21]). Following the unforeseen war outbreak in Ukraine, we submitted an addendum to the initial study proposal to the Swedish Ethical Review Authority, approved in 2022 (Dnr 2022-01362-02), that outlined our intention to analyze the data with regard for the war, because such analyses are fundamentally different from the initial proposal (i.e., treatment efficacy analyses vs increased symptoms of emotional disorders due to an unforeseen war outbreak).

The study was conducted through a secure online platform that encrypted all data which, in turn, ensured that individuals remain anonymous to us, the researchers, throughout the course of the study (Vlaescu et al., 2016). Moreover, no data that can link participant responses to an individual person were logged through this secure platform (e.g., IP-addresses); to link individual responses to persons, the dataset used in the present analysis would somehow need to be correlated with other data obtained outside the platform (Vlaescu et al., 2016). Furthermore, all data containing sensitive information that could identify individual participants were pruned from the data file prior to data analysis to further ensure participant privacy.
anonymity. All data are stored on my computer alongside the R script that reproduces the results of the current analysis.

In accordance with the Ethical Review Act (SFS 2003:460; Riksdagsförvaltningen, 2003) and guidelines for Good Research Practice (Vetenskapsrådet, 2017), participants provided their informed consent before active participation in the study. To that aim, they were informed that their participation was voluntary and did not pose any apparent risks. However, as part of explicitly obtaining informed consent, participants were made aware that active engagement with maladaptive emotional experiences (e.g., answering pre-screening questionnaires) can temporarily make such experiences more salient, with a small minority of individuals seeking internet-based therapy reporting adverse effects (see Andersson et al., 2016).

Data Analysis
The data was analyzed using R Studio (R Core Team, 2021). A panel-data regression analysis was conducted, wherein scores on the PHQ-9 and GAD-7 were separately predicted by the time course of treatment (i.e., a variable containing data that corresponded to the week in which data was provided; e.g., data provided between January 24th and January 30th, 2022, was assigned the number 1 corresponding to week one) and a dummy variable containing information about whether data corresponded to the time-period before or after the outbreak of war (i.e., all data corresponding to dates before February 24th, 2022, was coded as 0 and other data as 1), while adjusting for relevant covariates. Put differently, by separately regressing the PHQ-9 and GAD-7 against the time course of treatment, dummy variable, treatment group assignment, socioeconomic status, and gender, the effects of the war outbreak on depression and anxiety symptom severity can be elucidated, and thus answer our hypotheses. In addition, Cohen's $d$ effect sizes were computed to facilitate interpretations of the magnitude of the effect that the war outbreak had on anxiety and depressive symptoms, as well as for the analysis of the treatment efficacy and the effects of socioeconomic status on treatment outcomes. Effect size magnitudes were interpreted using Hemphill's (2003) interpretive framework for effect sizes as he empirically assessed the magnitude of the average effect sizes produced in psychological studies. As such, effect sizes below 0.4 were considered small in magnitude, effect sizes between 0.4 and 0.6 were considered moderate, and effect sizes above 0.6 were considered large.

To preserve power and minimize missing data, participants were only analyzed on the first 8 instances of data collection. This is because data was only collected for half of the participants for 8 weeks (i.e., participants were either assigned to 8 or 16 weeks, and thus observations corresponding to weeks 9-16 would be missing for roughly half of the sample due to the study design. It should however be noted that there was not a one-to-one correspondence between instances of data collection and week number of treatment; however, the first 8 instances contained the greatest number of data and thus selecting only those instances maximized the power of the current analysis). Moreover, since data was stratified by treatment group assignment and the experiment was conducted over several weeks, the assumptions of homogeneity and independence of error variance are violated. To counteract this, a robust version of the general linear model was fitted on the data that robustly contends with assumption violations. Specifically, a heteroscedasticity and autocorrelation consistent (HAC) covariance matrix estimation was used to obtain a robust estimation of the linear models' standard errors (Cribari-Neto & da Silva, 2011).

Additionally, due to a large number of missing observations in the dataset (i.e., 53% of the observations for depression and anxiety), the data was also modelled using a Full Information
Maximum Likelihood (FIML) estimation (cf. Hesser, 2015; Hoffart et al., 2022). For each missing observation, FIML estimation models borrow information, via an iterative process, from all observed data to produce parameter estimates that have the highest probability of reproducing the sample data and, thus, of being representative of the population parameters (Hesser, 2015). Put differently, FIML estimations mathematically quantify the standardized distance between observed data points and parameter values of interest to then minimize the difference between probable values to substitute for missing values. As such, FIML estimation models allow for parameter estimates despite missing data by estimating patterns of missingness (Baraldi & Enders, 2010).

An additional analysis was thus conducted to assess the convergence between FIML estimation and HAC covariance matrix estimation (i.e., compare the results obtained from the two methods). Isomorphic parameter estimates from both methods (i.e., in terms of signs and significance) will be taken as indicators of a stable and generalizable parameter estimation. However, if the results differ meaningfully, it will indicate that the parameter estimation is unstable and ungeneralizable.

Finally, to better approximate a representative model of the causal effect in question (i.e., the war outbreak's effect on anxiety and depressive symptom severity), all relevant variables were included in the analysis (Rohrer, 2018). A directed acyclic graph of the causal associations and interdependencies in the assumed data-generating process was constructed using DAGitty to guide the choice of variables to adjust for and not to adjust for in the present analysis (see Figure S1 in Appendix; Textor et al., 2016).

Results

Sample Characteristics

Descriptive statistics for the sample demographics are summarized in Table 1. During screening, PHQ-9 scores ranged from 1 to 19 (M = 11.76, SD = 4.16), and GAD-7 scores ranged from 0 to 21 (M = 9.74, SD = 4.16). In the four weeks leading up to the war outbreak, PHQ-9 scores ranged from 0 to 27 (M = 8.84, SD = 5.14), and GAD-7 scores ranged from 0 to 21 (M = 7.79, SD = 4.80). In the four weeks following the war outbreak, PHQ-9 scores ranged from 0 to 27 (M = 8.26, SD = 5.36), and GAD-7 scores ranged from 0 to 21 (M = 7.83, SD = 5.14). Finally, at post-assessment, PHQ-9 scores ranged from 0 to 27 (M = 8.27, SD = 5.50), and GAD-7 scores ranged from 0 to 21 (M = 7.40, SD = 4.81). Participants were, on average, in their 10th week of treatment when the war outbreak occurred.

Note that this statistic may be somewhat misleading. It was calculated by counting the number of potential instances of data collection from scheduled treatment onset (i.e., from the week after screening) and until the outbreak of war. Thereafter, the average number of potential instances of data collection was computed for the week in which the war outbreak occurred. However, the number of weeks between screening and war outbreak onset did not always have a one-to-one correspondence with actual treatment onset due to noncompliance. That is, sometimes there were a few nonresponse weeks between screening and treatment onset as well as between sessions provided (i.e., a participant assigned in a 16-week therapeutic intervention that did not provide data in week 2 was still allowed to complete their 16 weeks of therapy, and thus would be represented 17 times in the dataset). Nonetheless, this statistic hints at the time course of treatment when the war outbreak occurred, and suggests that the war outbreak occurred, on average, near the end of treatment.
Table 1. Demographical Descriptive Statistics.

<table>
<thead>
<tr>
<th>Participants</th>
<th>n = 1,222</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment group</strong></td>
<td></td>
</tr>
<tr>
<td>- Waitlist (8 weeks, no discussion forum access)</td>
<td>122 (10.0%)</td>
</tr>
<tr>
<td>- Waitlist (8 weeks, discussion forum access)</td>
<td>126 (10%)</td>
</tr>
<tr>
<td>- Waitlist (16 weeks, no discussion forum access)</td>
<td>158 (13%)</td>
</tr>
<tr>
<td>- Waitlist (16 weeks, discussion forum access)</td>
<td>154 (13%)</td>
</tr>
<tr>
<td>- Affect Phobia (8 weeks, no discussion forum access)</td>
<td>61 (5.0%)</td>
</tr>
<tr>
<td>- Affect Phobia (8 weeks, discussion forum access)</td>
<td>59 (4.8%)</td>
</tr>
<tr>
<td>- Affect Phobia (16 weeks, no discussion forum access)</td>
<td>117 (9.6%)</td>
</tr>
<tr>
<td>- Affect Phobia (16 weeks, discussion forum access)</td>
<td>111 (9.1%)</td>
</tr>
<tr>
<td>- Unified Protocol (8 weeks, no discussion forum access)</td>
<td>58 (4.7%)</td>
</tr>
<tr>
<td>- Unified Protocol (8 weeks, discussion forum access)</td>
<td>46 (3.8%)</td>
</tr>
<tr>
<td>- Unified Protocol (16 weeks, no discussion forum access)</td>
<td>110 (9.0%)</td>
</tr>
<tr>
<td>- Unified Protocol (16 weeks, discussion forum access)</td>
<td>100 (8.2%)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>42 (12)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>- Elementary school</td>
<td>34 (2.8%)</td>
</tr>
<tr>
<td>- High school</td>
<td>301 (25%)</td>
</tr>
<tr>
<td>- College-level education (&lt; 3 years)</td>
<td>331 (27%)</td>
</tr>
<tr>
<td>- College-level education (&gt; 3 years)</td>
<td>556 (45%)</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>- Female</td>
<td>1,055 (86%)</td>
</tr>
<tr>
<td>- Male</td>
<td>161 (13%)</td>
</tr>
<tr>
<td>- Other</td>
<td>6 (0.5%)</td>
</tr>
<tr>
<td><strong>Self-rated socioeconomic status</strong></td>
<td></td>
</tr>
<tr>
<td>- Much worse than others</td>
<td>55 (4.5%)</td>
</tr>
<tr>
<td>- Worse than others</td>
<td>280 (23%)</td>
</tr>
<tr>
<td>- About the same as others</td>
<td>528 (43%)</td>
</tr>
<tr>
<td>- Better than others</td>
<td>318 (26%)</td>
</tr>
<tr>
<td>- Much better than others</td>
<td>41 (3.4%)</td>
</tr>
<tr>
<td><strong>Children under 18 in the house</strong></td>
<td></td>
</tr>
<tr>
<td>- No</td>
<td>733 (60%)</td>
</tr>
<tr>
<td>- Yes</td>
<td>466 (38%)</td>
</tr>
<tr>
<td>- Complicated/Sometimes</td>
<td>23 (1.9%)</td>
</tr>
<tr>
<td><strong>Prior medication for anxiety/depression</strong></td>
<td>312 (26%)</td>
</tr>
<tr>
<td><strong>Current occupation</strong></td>
<td></td>
</tr>
<tr>
<td>- Working</td>
<td>840 (69%)</td>
</tr>
<tr>
<td>- Studying</td>
<td>164 (13%)</td>
</tr>
<tr>
<td>- Seeking work</td>
<td>62 (5.1%)</td>
</tr>
<tr>
<td>- Retired</td>
<td>61 (5.0%)</td>
</tr>
<tr>
<td>- Parental leave</td>
<td>15 (1.2%)</td>
</tr>
<tr>
<td>- Sick leave</td>
<td>80 (6.5%)</td>
</tr>
</tbody>
</table>

**Missing Data**
Given 1222 participants and eight instances wherein data is provided, the expected number of data points for the PHQ-9 and GAD-7 was 9776. However, 5184 instances of missing data were detected in the PHQ-9 (53%), and 5189 (53%) were detected for the GAD-7. In the PHQ-9, 2154 data points were missing in the first four instances of data collection, and 2970 were missing in the latter four instances of data collection. Similarly, 2156 data points were
missing for the first four instances of data collection, and 3033 were missing for the latter four instances of data collection in the GAD-7. For the eight instances when data was provided, a Fisher's exact test comparing the propensity for data being differentially missing between the first four and latter four instances revealed non-significant differences for both the PHQ-9 \( (p = .168) \) and GAD-7 \( (p = .204) \). Furthermore, no obvious trends of missingness were discernible as a function of age, gender, or SES.

**The Effects of the War Outbreak**

**Symptoms of Anxiety in Response to the Outbreak**

The war outbreak significantly increased average anxiety levels. Anxiety scores on the GAD-7 rose following the outbreak \( [t(4566) = 3.23, p = .001] \). Comparing two individuals with the same socioeconomic status, treatment group, education level, age, and gender, and adjusting for the data collection date, a 0.77-point increase in anxiety severity \( [95\% \text{ CI}: 0.30, 1.23; \text{effect size: } d = 0.08] \) was observed after the war outbreak. The data was most compatible with values ranging from a 0.30-point to a 1.23-point increase in GAD-7 scores. Consequently, the results suggest that the war outbreak exacerbated anxiety severity (see Figure 1).

![Figure 1. Graphical Depiction of Unadjusted Raw-Mean Scores and 95% Confidence Intervals for Anxiety Each Week, Over the Course of Treatment for All Treatment Groups.](image)

**Symptoms of Depression in Response to the Outbreak**

The outbreak of war did not significantly increase average levels of depression. Scores on the PHQ-9 slightly increased following the war outbreak \( [t(4566) = 0.39, p = .699] \), wherein comparing two individuals of the same socioeconomic status, treatment group, education level, age, and gender, while adjusting for the date on which data was provided, revealed a 0.09-point increase in average levels of depression \( [95\% \text{ CI}: -0.38, 0.56; \text{effect size: } d = 0.01] \) following the outbreak of war. The data was most compatible with values ranging from a 0.38-point decrease to a 0.56-point increase in scores on the PHQ-9. As such, the results do not indicate that the war outbreak significantly affected depression severity (see Figure 2).
Socioeconomic Status as a Protective Factor

Socioeconomic status was inversely associated with anxiety severity over time \([t(4566) = -3.61, p < .001]\) during the present study. When comparing two individuals on the same date, within the same treatment group, of the same age, gender, and education level, while adjusting for the outbreak of war, a 1-point increase in self-rated socioeconomic status was associated with a 0.69-point average decrease in scores on the GAD-7 [95% CI: -1.06, -0.31; effect size: \(d = 0.32\)]. The data was most compatible with values ranging from a 1.06-point decrease to a 0.31-point decrease in scores on the GAD-7. Thus, anxiety symptom severity is, on average, lower for people with relatively higher socioeconomic status when controlling for the time course of treatment, war outbreak, gender, and treatment group, in turn, suggesting that socioeconomic status may be a potential protective factor for anxiety symptoms during a war outbreak (cf. entropy increase). Adding an interaction term between the war outbreak dummy variable and socioeconomic status did not increase the model fit nor alter the coefficient estimates.

Socioeconomic status was also inversely associated with depression severity over time \([t(4566) = -5.28, p < .001]\) during the present study. When comparing two individuals on the same date, within the same treatment group, of the same age, gender, and education level, while adjusting for the outbreak of war, a 1-point increase in self-rated socioeconomic status was associated with a 1.09-point average decrease in scores on the PHQ-9 [95% CI: -1.49, -0.68; effect size: \(d = 0.48\)]. The data was most compatible with values ranging from a 1.49-point decrease to a 0.68-point decrease in scores on the PHQ-9. Thus, depressive symptom severity is, on average, lower for people with relatively higher socioeconomic status when controlling for the time course of treatment, war outbreak, gender, and treatment group, in turn, suggesting that socioeconomic status may be a potential protective factor for depressive symptoms during a war outbreak (cf. entropy increase). Adding an interaction term between the war outbreak dummy variable and socioeconomic status did not increase the model fit nor alter the coefficient estimates.
**Overall Treatment Efficacy**

During the study period, average depression and anxiety levels decreased. Specifically, anxiety scores on the GAD-7 decreased over time \([t(4566) = -2.46, p = .014]\). Comparing two individuals with the same socioeconomic status, treatment group, education level, age, and gender, and adjusting for the war outbreak, a 0.12-point average weekly decrease \([95\% \text{ CI: -0.22, -0.03; effect size: } d = 0.02]\) in anxiety severity was observed. The data was most compatible with values ranging from a 0.22-point to a 0.02-point average weekly decrease in GAD-7. Thus, the results indicate that anxiety severity significantly declined during the study.

Similarly, depression scores on the PHQ-9 declined over time \([t(4566) = -2.82, p = .005]\). Comparing two individuals with the same socioeconomic status, treatment group, education level, age, and gender, and adjusting for the war outbreak, a 0.15-point average weekly decrease \([95\% \text{ CI: -0.25, -0.05; effect size: } d = 0.10]\) in depression severity was found. The data was most compatible with values ranging from a 0.25-point to a 0.04-point average weekly decrease in PHQ-9. Thus, the results indicate that depression severity significantly declined during the study.

**Additional Analyses**

**Full Information Maximum Likelihood (FIML) Estimation**

To further support the previously reported results, linear models for the PHQ-9 and GAD-7 were analyzed using FIML estimations (see Table 2). This analysis produced parameter estimates that were consistent with HAC covariance matrix estimation results reported earlier (i.e., equivalent parameter estimates and \(p\)-values). Moreover, an additional analysis that adjusted for all background variables at our disposal also produced parameter estimates that were consistent with both the HAC covariance matrix estimation and FIML results. Taken together, the parameter estimates seem stable in the current analysis, and patterns of missing data do not appear to significantly impact the results.

<table>
<thead>
<tr>
<th></th>
<th>Robust Estimate</th>
<th></th>
<th>FIML Estimate</th>
<th></th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHQ-9</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week number</td>
<td>-0.15</td>
<td>0.005</td>
<td>-0.15</td>
<td>0.01</td>
<td>0.10</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>0.09</td>
<td>0.70</td>
<td>0.15</td>
<td>0.61</td>
<td>0.01</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>-1.09</td>
<td>&gt; 0.001</td>
<td>-1.10</td>
<td>&gt; 0.001</td>
<td>0.48</td>
</tr>
<tr>
<td><strong>GAD-7</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week number</td>
<td>-0.12</td>
<td>0.14</td>
<td>-0.13</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>Dummy variable</td>
<td>0.77</td>
<td>0.001</td>
<td>0.80</td>
<td>0.004</td>
<td>0.08</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>-0.69</td>
<td>&gt; 0.001</td>
<td>-0.69</td>
<td>&gt; 0.001</td>
<td>0.32</td>
</tr>
</tbody>
</table>

1 These analyses also adjust for treatment group assignment, education level, age, and gender. Additionally adjusting for marital status, prior medication use, occupation, and presence of children under 18 living in the house did not alter these parameter estimates.

2 Heteroscedasticity and autocorrelation consistent (HAC) covariance matrix estimation.

3 5184 observations.

4 Dates before war outbreak = 0; dates after war outbreak = 1.

5 5189 observations.
Discussion

The present study aimed to elucidate the effects of the outbreak of war in Ukraine following the Russian invasion on February 24th on measures of anxiety and depressive symptom severity. To our knowledge, this is the first study on the indirect effects of the war in Ukraine on emotional disorders in a clinical population. The results indicate that anxiety symptoms significantly increased in response to the war outbreak, as predicted, although this effect was small in magnitude (cf. Hemphill, 2003). Anxiety symptom severity generally declined before the outbreak of war (indicating treatment effectiveness), spiked following the war outbreak, before rapidly declining below pre war outbreak levels. However, contrary to our hypothesis, the war outbreak had a negligible effect on depressive symptoms. Depressive symptoms gradually declined throughout the duration of the study and did not spike in response to the war outbreak. The treatment interventions more successfully reduced depressive symptoms than anxiety symptoms (i.e., the effect size was five times larger for depression than anxiety). Finally, socioeconomic status had a moderate effect on decreased anxiety symptoms and large effect of decreased depressive symptoms over the course of treatment, irrespective of the war outbreak. These findings thus provide support for the notion that socioeconomic status serves as a protective factor against psychopathology in times of heightened uncertainty.

The finding that anxiety symptom severity increased in response to the war outbreak, but depressive symptom severity did not, may relate to how anxiety and depression are differentially associated with intolerance of uncertainty. As noted in the introduction, intolerance of uncertainty, which may underpin many psychopathological impairments to daily functioning, appears to be more pronounced in anxiety disorders than depression (Jensen et al., 2016). This is reflected in the American Psychiatric Association's (2022, p. 215) definition of anxiety as the “anticipation of [a] future threat,” which coincides with the definition of intolerance of uncertainty (i.e., responding to uncertainty-inducing events with discomfort and anxiety which, in turn, further increases negative affectivity, cf. psychological entropy; Hirsh et al., 2012; Jensen et al., 2016). Furthermore, even though the effect of the war outbreak on anxiety symptoms is small in magnitude by most statistical standards, it is important to consider the clinical implications of uncertainty-inducing events on anxiety symptoms within a treatment-seeking population and place the effect in a broader context. For instance, the magnitude of the effect between increased anxiety symptoms in response to the war outbreak is slightly larger than the association between aspirin consumption and heart attack prevention (Rosenthal, 1991, p. 136; see also Hemphill, 2003). Moreover, this effect size mirrors typical effect sizes in studies examining the effect of disasters on mental health disorders, where pooled effect estimates range from 0.05 and 0.20 (Keya et al., 2023).

The present study has limitations. In line with previous studies (e.g., Guerra & Eboreime, 2021; Skwirczyńska et al., 2022), we found socioeconomic status to buffer against psychopathological development following the abrupt increase in external uncertainty due to the war outbreak. Individuals of a higher self-reported socioeconomic status were less impacted on depressive and anxiety measures by the war outbreak in Ukraine and appeared to benefit more from the psychotherapeutic interventions. However, interpretations of this effect may be limited by the use of self-reported socioeconomic status, where participants rated their socioeconomic status in relation to others instead of objectively. Another limitation is lack of control for media exposure. Previous studies indicate that frequency of media exposure covaries with anxiety and depression symptom severity (Gao et al., 2020; Riad et al., 2022). As such, our lack of control for participant exposure to media coverage of the war may have attenuated (or even augmented) the effects of the war outbreak on anxiety and depression.
Moreover, an accurate representation of the effect of the war outbreak on treatment efficacy could not be contextualized appropriately in the current analysis. That is, the average treatment efficacy has not yet been established for this sample because the larger study from which this paper bridges off from is still ongoing. As such, the treatment efficacy estimates obtained in the present study can (and ought) be compared with the treatment efficacy estimates observed in the larger study upon its completion.

Furthermore, we could have conducted qualitative interviews with participants to gain insight into their experiences and perceptions of the war outbreak and its potential effects on their mental health. Future studies could ameliorate this limitation by incorporating an ecological momentary assessment protocol (e.g., Verhagen et al., 2022), wherein data on exposure to war-related media and self-reported affectedness of the war outbreak is collected with high frequency concomitantly with indices of anxiety and depression. Additionally, no clinical interviews were conducted to accurately detect whether participants qualified for an anxiety or depressive disorder diagnosis. However, only treatment-seeking participants with scores indicative of an emotional disorder were included in the study, and the PHQ-9 and GAD-7 routinely emerge as good indicators of depressive and anxiety disorders (Byrd-Bredbenner et al., 2021; Johnson et al., 2019; Kroenke et al., 2010; Martin-Key et al., 2022).

Finally, the large numbers of missing observations in the measures of anxiety and depression severity somewhat limit the statistical analyses. The possibility that participants selectively neglected to provide data when they suffered most severely from depression and/or anxiety cannot be eliminated. However, there were no discernible trends in the missingness of data. Moreover, modelling the data with state-of-the-art statistical procedures for handling missing data (i.e., FIML and robust HAC versions of the general linear model) did not influence the statistical conclusion of the results as it yielded isomorphic estimations. FIML parameter estimations are recommended to mitigate potential statistical biases that arise from large amounts of missing data (Hesser, 2015) which, in turn, supports this assertion.

The present study has numerous strengths. Firstly, this study is the first analysis of the impact of the war in Ukraine in a clinical sample, wherein greater average variability in indicators of depression and anxiety is to be expected (Hirsh et al., 2012; Sauer-Zavala & Barlow, 2021). Nonetheless, a clear upward spike was discernible in average levels of depression and anxiety severity in response to the outbreak of war. Secondly, measures of anxiety and depression severity were obtained weekly throughout the treatment intervention, allowing for a representative estimation of the psychopathological response to the war outbreak. Thirdly, given that psychopathological development surges in response to abrupt uncertainty-inducing events (cf. entropy increase; Guerra & Eobreime, 2021; Hirsh et al., 2012; Lim et al., 2022; Osokina et al., 2022; Riad et al., 2022), this study may have buffered psychopathological development among Swedish individuals. Other strengths include the exclusive inclusion of treatment-seeking individuals and an adequately large sample size.

The present study has implications for how abrupt uncertainty-inducing events can be mitigated at a population level. Briefly, our results indicate that anxiety symptom severity rises in conjunction with increased environmental uncertainty (cf. entropy increase); a particularly interesting finding when contextualized in terms of the distance between Sweden and Ukraine (i.e., over 1500 km). Individuals already at risk for psychopathology may need additional consideration when uncertainty-inducing events occur abruptly, even if such events have spatially distant origins. Readily accessible health care services, such as government-
funded internet-based psychotherapy, may help alleviate some of the societal burdens associated with abrupt uncertainty-inducing events and mitigate their societal costs. This is particularly important for individuals with a below-average socioeconomic status as they may face additional challenges in the wake of such events.

Finally, this study holds implications for practicing clinicians. It suggests that when psychotherapy is provided during crises, a sudden increase in anxiety symptoms can be expected as a response to heightened environmental uncertainty (cf. entropy increase). However, statistically controlling for crises-related increases reveals that the overall severity of anxiety symptoms continues to decrease throughout the course of treatment, with stable treatment efficacy. As such, an increase in anxiety symptoms during crises situations should not automatically be interpreted as an indicator of unsuccessful treatment. Instead, it should be recognized as a potential confounding factor in estimating treatment efficacy.

**Conclusion**

The present study highlights the impact of the Ukrainian war outbreak on emotional disorders, particularly anxiety symptoms, in a clinical population. Anxiety symptom severity seems to be sensitive to the conflict's influence, experiencing an increase following the war outbreak that is of a moderate magnitude in comparison with typical effect sizes in studies examining the effect of disasters on mental health disorders. Moreover, socioeconomic status may serve as a protective factor against the development of psychopathological disorders in the wake of uncertainty-inducing events. Finally, this study reinforces previous findings demonstrating the effectiveness of internet-based psychotherapeutic interventions in alleviating emotional disorder symptoms.
References


Andersson, G., Carlbring, P., & Lindefors, N. (2016). History and Current Status of ICBT. In N. Lindefors & G. Andersson (Eds.), *Guided Internet-Based Treatments in Psychiatry* (pp. 1–16). Springer International Publishing. https://doi.org/10.1007/978-3-319-06083-5_1


Assuming the causal model depicted in Figure S1 is representative of the data-generating process, the minimal adjustment set to discern the effects of the war outbreak on depression and anxiety involves adjusting for socioeconomic status, gender, educational level, age, and treatment group assignment.