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Review Article

A 20-years+ review of the Stanford Acute Stress Reaction Questionnaire (SASRQ): Psychometric properties and findings

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ABSTRACT

The fourth edition of the Diagnostic and Statistical Manual introduced the diagnosis of Acute Stress Disorder (ASD) for acute pathological reactions including dissociative ones, following a traumatic event. Various measures of ASD have been developed, with the Stanford Acute Stress Reaction Questionnaire (SASRQ) being one of the most commonly used across the world. This paper systematically covers more than 20 years of research with it and 90 papers in different languages. The main conclusion is that the SASRQ and its translations to other languages have consistently shown convergent, divergent, and predictive validity, besides exhibiting good reliability. We finish the paper by advancing suggestions for future development including the use of a new SASRQ version that follows DSM-5 criteria, evaluating whether distinct items or subscales differentially predict different types of acute- and long-term posttraumatic symptomatology, and assessing its clinical usefulness.

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The fourth edition of the DSM-IV (American Psychiatric Association 2000) introduced the diagnosis of Acute Stress Disorder (ASD) for acute pathological reactions, including dissociative ones, following a traumatic event. The diagnosis included five types of symptoms: dissociation, reexperience, avoidance, arousal, and functional impairment, with at least one symptom in each subcategory except for dissociation where three symptoms were required. The rationale for its proposal was to “encourage greater clinical and research attention to the substantial number of people who may have severe and acute dissociative and anxiety reactions to trauma and bring the DSM nosology into greater accord with the ICD-10 diagnosis of acute stress reaction” (Cardena, Lewis-Fernández, Beahr, Pakianathan & Spiegel, 1996, p. 994). Thus, evaluation and treatment of a specific syndrome rather than using the vague “adjustment disorder” could be investigated without having to wait a whole month before considering a Posttraumatic Stress Disorder (PTSD) diagnosis, with the goal of ameliorating ongoing suffering and dysfunction, and perhaps preventing the development of chronic conditions such as posttraumatic stress disorder (PTSD). Various self-report and interview measures of ASD were created and in this paper we focus on the Stanford Acute Stress Reaction Questionnaire (SASRQ), employed in many studies since and translated into at least 8 other languages: Chinese (Zhang et al., 2021), Danish (Pedersen & Zachariae, 2010), German

(author unknown), Hebrew (Bleich, Gelkopf & Solomon, 2003), Italian (Casacchia, Bianchini, Mazza, Pollice & Roncone, 2013), Korean (Kweon et al., 2013), Spanish (Pérez et al., 2014), and Swedish (Kjellenberg, Nilsson, Daukantaitė & Cardena, 2014).

Our review focuses on evaluating the psychometric properties of the SASRQ in research contexts. The SASRQ does not cover all potential posttraumatic reactions, but it includes a wide array of intrusion, negative mood, dissociative, avoidance, and arousal symptoms, in addition to questions about functional impairment, duration of the symptoms, and timing of exposure to the stressful event. Although for ASD diagnosis the exposure should have occurred within the last 30 days, for clinical purposes, such as ongoing evaluation of the progress of therapy, there is no reason why the SASRQ cannot be administered independently of exposure timing.

SASRQ validity and reliability

The initial version of the SASRQ was developed from a 98-item checklist, which was reduced to 30 items after ascertaining that all DSM-IV ASD criteria items were represented and showed predictive validity for later PTSD symptomatology (PTS), deleting repetitive items, and selecting the items most likely to predict pathology. That paper reported the SASRQ’s validity and internal consistency by analyzing 10 different studies on various groups exposed to potentially traumatizing events such as natural disasters, being close to a shooting, witnessing an execution, and others (Cardena, Koopman, Classen, Waelde & Spiegel, 2000).

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Since that time there has been no systematic review of the use and psychometric properties of the measure, so we conducted a systematic review with PsycINFO as the primary database and Google Scholar and PubMed as supplementary sources. The search words used were “SASRQ” OR “Stanford Acute Stress Reaction Questionnaire” without language restrictions, selecting peer-reviewed studies published in academic journals. The criteria for exclusion were that the article not pertain to the validity of the SASRQ, such as when it was referenced as an inspiration for development of a new questionnaire or when scores on the SASRQ were used as an inclusion criterion but not followed up or reported in the study. From the 251 items obtained through PsycINFO, we found 75 studies in which the SASRQ had been used as a measurement of acute stress reactions (or in some cases posttraumatic stress reactions), and its data were reported and related to the validity of the SASRQ. Supplementing these items with non-overlapping ones found through the supplementary sources or obtained through correspondence added 15 additional non-overlapping items. We review those 90 papers.

The SASRQ as a measure of acute stress reactions and acute stress disorder

Many studies show that respondents exposed to different types of stressful events tend to have high scores in the SASRQ. In some, participants met DSM-IV diagnostic criteria for ASD (Barr, 2010; Bowles et al., 2006; Gelkopf, Solomon, Berger & Bleich, 2008; Ginzburg & Ein-Dor, 2011; Gonzalo et al., 2021; Hansen, Lasgaard & Elklit, 2013; Holman, 2012; Imran, Masood, Ayub & Gondal, 2020; Israelski et al., 2007; Jose, 2018; Jubinville, Newburn-Cook, Hegadoren & Lacaze-Masmonteil, 2012; Kassam-Adams, Fleisher & Winston, 2009; Kutz & Dekel, 2006; Liu, Xu & Liu, 2021; Pedersen & Zachariae, 2010; Petteys, Goebel, Wallace & Singh-Carlson, 2015; Qiu, Watson & Tay, 2022; Rodin et al., 2013; Shahrouh & Dardas, 2020; Shaw et al., 2009; Shaw et al., 2014a, 2014b; Wang et al., 2021), while in others a high proportion of participants met the criteria for partial or subclinical ASD, defined as one symptom of each DSM-IV criterion (Casacchia et al., 2013), meeting all criteria except dissociation (Kassam-Adams et al., 2009), or being one criterion below an ASD diagnosis (Petteys et al., 2015). In a sample with major burn injuries, McKibben and collaborators (2008) reported that both DSM-IV diagnostic criteria or total SASRQ scores (≥ 40) provided moderate to high sensitivities and specificities in predicting higher PTS scores.

Events after which a large proportion of the sample had high scores include an earthquake (Casacchia et al., 2013), a bank robbery (Hansen et al., 2013), witnessing a terror attack, either directly or through the media, (Holman, 2012; Jose, 2018; Thompson, Holman & Silver, 2020), or being diagnosed with a potentially fatal disease such as HIV/AIDS or cancer (Israelski et al., 2007; Pedersen & Zachariae, 2010; Rodin et al., 2013). Parents whose children had been in an accident had high scores on the SASRQ (Kassam-Adams et al., 2009), as did parents of premature infants being treated in neonatal intensive care (Barr, 2010; Petteys et al., 2015; Shaw et al., 2009), and mothers of premature children (Jubinville et al., 2012).

Greater exposure to stressful situations ought to lead to a stronger reaction and higher scores on the SASRQ, and this has been the case in many studies (Barr, 2010; Cardeña, Dennis, Winkel & Skitka, 2005; Casacchia et al., 2013; Hansen et al., 2013; Holman, Garfin & Silver, 2014; Hunt, Al-Awadi & Johnson, 2008; Imran et al., 2020; Jose, 2018; Kassam-Adams et al., 2009; Koopman, Zarccone, Mann, Freinkel & Spiegel, 1998; Shaw et al., 2009; Spiegel, Koopman, Cardeña & Classen, 1996; L. Zhang et al., 2021). For example, there was a significant dose relation for SASRQ items related to acute dissociation and anxiety, as well as to somatic anxiety (the last obtained through a longer list of reactions in a preliminary version of the SASRQ) symptoms in a study of the immediate aftermath of a firestorm, with those considered having *high* (i. e., losing one's residence

or being injured), *medium* (e.g., being evacuated, having trouble breathing), or *low* (e.g., seeing flames or smoke) contact (Spiegel et al., 1996). More hours of exposure to a terror attack through the media were linked to higher scores on the SASRQ (Cardeña et al., 2005; Holman et al., 2014, 2020; Silver et al., 2013), as did consumption of media related to possible Ebola contagion and previous acute stress (Thompson, Garfin, Holman & Silver, 2017).

Relatedly, peritraumatic dissociation, (i. e., dissociation around the time of trauma; for a review see Cardeña & Classen, in press) predicted acute stress and higher scores on the SASRQ (Hunt et al., 2008). Furthermore, higher heart rate during a stressful event was associated with later acute stress and high scores on the SASRQ (Gould et al., 2011). One study indicated that participants who believed that a certain event would have a big impact on the future tended to score higher on the SASRQ (Maldonado et al., 2002) Gelkopf, Berger and Roe (2016). found that soldiers who witnessed or participated in degrading actions towards civilians scored higher on the SASRQ than those who did not.

In studies of young children with burn injuries, parents' scores on the SASRQ were linked to the levels of the acute stress of their children (Saxe et al., 2005; Stoddard et al., 2006), and one study found that the magnitude of a child's burn injury mediated the parents score on the dissociation scale of the SASRQ, which in turn predicted later parental PTS (Hall et al., 2006).

Convergent and discriminant validity of the SASRQ

Convergent validity relates to the notion that similar constructs should correlate strongly with one another. Discriminant validity on the other hand implies that dissimilar constructs should not correlate or at most correlate weakly with one another (Shadish, Cook & Campbell, 2001) Cardeña et al. (2000). found large correlations between the SASRQ and the Impact of Event Scale (IES) in two of the studies presented in that article. In one, the SASRQ correlated strongly with the IES, $r = .75$, and only moderately with more psychosis-related “first rank” symptoms such as hearing voices, $r = .38$, which are also present in people with dissociative disorders (Longden et al., 2020) Kweon et al. (2013). found that the Korean translation of the SASRQ correlated strongly with two questionnaires that measure reactions to stressful/traumatic situations, the *Impact of Event Scale-Revised* (Weiss & Marmar, 1997), $r = .81$ and the *Perceived Stress Scale* (Cohen, Kamarck & Mermelstein, 1983), $r = .52$.

In contrast, the SASRQ shows smaller, often nonsignificant correlations with measures that do not evaluate reactions to stress, supporting divergent validity. In the Korean study, there was a nonsignificant correlation, $r = .07$, with the Social Desirability Scale (Kweon et al., 2013) Barr (2010). found a small correlation between scores on the SASRQ and shame, $r = .10$, small to moderate correlations between scores and guilt, $rs = .26 - .36$, and a moderate to large correlation between SASRQ scores and fear of death, $rs = .40 - .50$. The SASRQ had a moderate correlation with anxiety, $r = .40$ (Brelsford & Doheny, 2020), and moderate to large correlations with depression, $rs = .40 - .55$ (Brelsford & Doheny, 2020; Ginzburg et al., 2016). Constructs such as depression and anxiety are related to acute stress because they are forms of psychological distress and may increase after exposure to trauma, but are not as conceptually similar as scales measuring PTS, so their smaller correlations with the SASRQ support discriminant validity.

Another aspect of convergent validity refers to negative correlations with constructs that are assumed to oppose each other. Higher SASRQ scores correlated negatively with wellbeing (Brelsford & Doheny, 2020; Zhang et al., 2021); sleep quality (Di Filippo et al., 2021; Xiao, Zhang, Kong, Li & Yang, 2020); how much mothers connected emotionally with their babies (Brelsford & Doheny, 2020); self-efficacy (Di Filippo et al., 2021; Kamen et al., 2013; Liao et al., 2020; Liu et al., 2021; Xiao et al., 2020); and acceptance as a coping

strategy (Casacchia et al., 2013). Pham (2012), found that people with a high level of psychopathic traits scored lower on the SASRQ than people with fewer psychopathic traits, and lack of affect correlated with lower scores, perhaps because of lower levels of anxiety in those groups. Relatedly, interventions that lower stress reactions were associated with lower SASRQ scores. One study showed that an ad-hoc mindfulness intervention decreased SASRQ anxiety and arousal symptoms (Mendelson et al., 2018), another found that “nature adventure rehabilitation” was associated with decreased SASRQ scores (Gelkopf, Hasson-Ohayon, Bikman & Kravetz, 2013).

Predictive validity

Many studies have shown that high scores on the SASRQ predict later high scores on scales that measure posttraumatic symptomatology (Birmes et al., 2001, 2003, 2005; Bowles et al., 2006; Bui et al., 2010; Classen, Koopman, Hales & Spiegel, 1998; Gil-Rivas, Holman & Silver, 2004, 2007; Ginzburg & Ein-Dor, 2011; Grieger et al., 2000; Hall et al., 2006; Holman, Garfin, Lubens & Silver, 2020; Hunt et al., 2008; Kassam-Adams et al., 2009; Koopman et al., 1998; Kutz & Dekel, 2006; Lucas-Thompson & Holman, 2013; McKibben, Bresnick, Wiechman Askay & Fauerbach, 2008; Pérez et al., 2014; Schlesinger et al., 2020; Shaw et al., 2009, 2013). Furthermore, higher SASRQ scores predict later anxiety (Gil-Rivas et al., 2004, 2007; Pérez et al., 2014), depression (Ginzburg, 2006; Hunt et al., 2008; Shaw et al., 2009), fear of terrorism (Holman & Silver 2005; Holman et al., 2020), functional impairment (Holman et al., 2020; Koopman et al., 1998; Lucas-Thompson & Holman, 2013), cognitive avoidance (Pérez et al., 2014), and financial stress (Lucas-Thompson & Holman, 2013).

With respect to other measures, scoring high on the dissociation subscale in the SASRQ predicted mortality in patients who had recently suffered a heart attack (Ginzburg et al., 2016). A study on professionals who treat traumatized individuals found that high levels of SASRQ depersonalization and functional impairment predicted compassion fatigue (Kjellenberg et al., 2014). After the terrorist attacks of 9/11, scoring high on the SASRQ predicted increased search for meaning two months after the attacks, which in turn predicted higher PTS two years later (Updegraff, Silver & Holman, 2008). Moreover, for parents of children that had been physically injured, higher scores on the SASRQ predicted an increased likelihood of seeking care and support for the child’s needs (Marsac, Cirilli, Kassam-Adams & Winston, 2011).

Moderators/mediators of SASRQ scores

Several studies have shown that women tend to score higher than men (Barr, 2010; Cardeña et al., 2005; Di Filippo et al., 2021; Gil-Rivas et al., 2004; Gonzalo et al., 2021; Hansen et al., 2013; Holman et al., 2020; Imran et al., 2020; Israelski et al., 2007; Lucas-Thompson & Holman, 2013; Pedersen & Zachariae, 2010; Rodin et al., 2018; Shaw et al., 2006), and women with preexisting anxiety have higher SASRQ scores (Miguel-Puga et al., 2021). This is consistent with higher posttraumatic symptomatology (or at least reports of) among women (Brewin, Andrews & Valentine, 2000). In people with a severe form of leukemia, high SASRQ scores were related to having young children and being unmarried (Rodin et al., 2018), lower self-esteem, lower spiritual well-being, (Rodin et al., 2013, 2018), anxious attachment, and poorer communication with health-care providers (Rodin et al., 2013). SASRQ scores also related to spiritual struggles (Brelsford & Doheny, 2020), neuroticism (Telle, Vicenzutto, Buchet, Plaisant & Hoang, 2019), anxiety (Di Filippo et al., 2021; Xiao et al., 2020), psychological distress (Shahrour & Dardas, 2020; Wang et al., 2021), less social support (Di Filippo et al., 2021; Liao et al., 2020; Liu et al., 2021; Rodin et al., 2013; Xiao et al., 2020), burnout (Miguel-

Puga et al., 2021), being divorced or widowed (Zhang et al., 2021), and physical inactivity (Zhang et al., 2021).

In line with research showing that earlier traumatic events are risk factors when facing new stressors (Brewin et al., 2000), previous trauma and a history of mental illness related to higher scores on the SASRQ after exposure to a stressful event (Classen et al., 1998; Garfin, Holman & Silver, 2015, 2020; Geng, Zhou, Liang & Fan, 2018; Gil-Rivas et al., 2004; Ginzburg et al., 2016; Holman et al., 2020; Kassam-Adams et al., 2009; Lucas-Thompson & Holman, 2013; Maldonado et al., 2002; Rodin et al., 2013). With respect to single subscales, Koopman et al. (2001) reported that war veterans were more likely to have high scores on several of the dissociative symptoms in the SASRQ following later exposure to stressful events. Similarly, having been victim of sexual abuse in childhood correlated with higher scores on the dissociation subscale of the SASRQ (Kamen, Bergstrom, Koopman, Lee & Gore-Felton, 2012), whereas high scores on the anxiety subscale related to having a history of trauma (Dulin & Passmore, 2010) Shaw, McFarlane, Bookless and Air (2002). found that participants who had experienced a psychotic episode scored higher on the intrusion and avoidance subscales

Among healthcare workers during the COVID-19 pandemic, higher SASRQ scores related to having been in Wuhan (L. Zhang et al., 2021), not having access to protective material (Gonzalo et al., 2021), perceived risk (Gonzalo et al., 2021; L. Zhang et al., 2021), COVID-19 infection among people one knows (Di Filippo et al., 2021), and how long one expected the duration of the pandemic to be (L. Zhang et al., 2021). Among students of healthcare professions during the pandemic, higher SASRQ scores were connected to exposure to COVID-19 patients, experiencing symptoms, lower awareness of the pandemic, and getting news of the pandemic through unofficial sources (L. Zhang et al., 2021). Higher scorers were more likely to believe they would quit the profession (Zhang et al., 2021) and SASRQ scores were negatively associated with a positive professional identity in a sample of nursing students (Wang, Wang, Zhang, Tian & Luo, 2020). Coping strategies associated with SASRQ scores include behavioral inhibition, seeking emotional support (Casacchia et al., 2013), “immature coping styles” (Hui-Fu et al., 2011), passive coping styles (Liu et al., 2021), and expressing distress overtly (Maldonado et al., 2002; Seery, Silver, Holman, Ence & Chu, 2008).

Reliability

In five studies of the initial SASRQ analysis, alphas ranged from .80 to .95, showing very good internal consistency (Cardeña et al., 2000). Later studies have obtained similar alphas, between .79 and .95 (Barr, 2010; Bernard et al., 2011; Cardeña et al., 2005; Marsac et al., 2011; Woike & Matic, 2004). The Spanish translation had $\alpha = .90$ for the total score, and .81 for the dissociation, .78 avoidance, .74 hyperarousal, and .70 reexperiencing subscales (the functional impairment subscale was not assessed). The Danish translation had $\alpha = .96$ for the full scale and between .80 and .90 for the subscales, except for the 2-item functional impairment subscale, which was .58 (Pedersen & Zachariae, 2010). Similarly, the Korean translation had moderate to good test-retest reliability for all subscales except for impairment in functioning (Kweon et al., 2013). The Hebrew version had an overall $\alpha = .91$ and high test-retest reliability ($r = .85$) (Bleich et al., 2003; Gelkopf et al., 2008). Research with the Swedish version evaluated only the depersonalization and impairment of functioning subscales, which had α s = .71 and .77 respectively.

Discrepant results

A few studies have reported discrepant results Silverstein et al. (2019). did not find significant differences between two groups that were assumed to have experienced different levels of stress (women who had required an emergency team response

intervention compared to those who had not); according to the researchers the non-significant results could be explained by the fact that childbirth is a strenuous experience with or without an acute intervention and that the sample of those who had had the intervention was very small [Petteys et al. \(2015\)](#). studied parents with infants in neonatal intensive care and did not find a significant difference in SASRQ between those who received palliative care and those who did not [Ginzburg \(2006\)](#). did not find a significant correlation between the SASRQ and PTS or depression. All three studies mentioned low statistical power as a limitation in the interpretation of the results.

A longitudinal study of the psychological consequences of the terrorist attacks of 9/11, 2001, on a national sample of North Americans did not support the theory that proximity to a catastrophic event generates a more severe stress response, since the proximity to the World Trade Center on the day of the attacks did not influence the severity of acute stress reactions ([Silver et al., 2004](#)). However, being a resident of New York city, which received the brunt of the attack, was related to higher SASRQ scores in comparison with other areas of the USA ([Cardeña et al., 2005](#)).

[Liao et al. \(2020\)](#) reported that nurses who worked directly with COVID-19 patients scored lower on the SASRQ than those who did not, which the authors hypothesized might have been because all nurses were subject to a risk of infection while the ones who worked with COVID-19 patients had higher levels of social support and perhaps more protection in their workplace [Di Filippo et al. \(2021\)](#). did not find a significant difference in SASRQ scores between primary and secondary care staff who worked during the COVID-19 pandemic, but concluded that this might have been because of low sample size and the fact that the groups consisted of different types of professions.

Discussion and conclusions

This review of the last 20+ years of the use of the SASRQ in English and its translations shows it to be a robust measure of acute stress reactions to various potentially traumatizing events, measured in different languages. The events include direct or media-exposure to natural disasters, human-made violence, self- or other severe medical condition, and so on. The convergent validity of the SASRQ includes strong correlations with established measures of PTS, as well as related measures of anxiety and depression. Relatedly, the SASRQ predicts significantly (although not perfectly, as no measure does) later PTSD symptomatology and diverse negative psychological and medical outcomes, supporting the general construct of Acute Stress Disorder. Considering the SASRQ validity and predictive power for PTS and negative correlations with such measures as wellbeing, there is no reason why it might not be used in the clinical setting to: 1) ascertain which symptoms may be of greater concern to a patient, 2) develop targeted interventions, and 3) trace the progress of therapy by using it repeatedly ([Feuerstein, 1999](#)). but this is an area that requires development using group and single case designs.

Limitations

This study has the limitations inherent to the studies themselves, including the fact that research so far has concentrated on the first version of the SASRQ, which was based on the DSM-IV ASD diagnostic criteria ([American Psychiatric Association 2000](#)). To evaluate DSM-5 ASD diagnostic criteria, a new version of the SASRQ (the SASRQ-II) was developed, and its Swedish translation was validated in a study with Swedish nurses ([Palmborg, Lötval & Cardeña, 2020](#)). Another limitation is that the timing of administration of the SASRQ has varied widely, from a few weeks (e.g., [Cardeña et al., 2005](#)) to months or even years later (e.g., [Grieger et al., 2000](#)). With respect to the SASRQ as a predictor of PTSD measures or diagnosis, the following should be

borne in mind. First, although ASD could be thought of as an acute form of PTSD, the diagnostic criteria for both in the DSM-IV (particularly) and DSM-5 have never matched completely. Second, there are literally hundreds of thousands of permutations of PTSD diagnostic criteria ([Galatzer-Levy & Bryant, 2013](#)) and many permutations of ASD criteria. Considering either diagnosis as a coherent unity is questionable. The adoption of a dissociative qualifier type of PTSD involving depersonalization/ derealization ([American Psychiatric Association 2013](#)) and data showing something similar in ASD ([Hansen, Armour, Wang, Elkli & Bryant, 2015](#)) are probably just initial indicators of a diverse set of not fully identified posttraumatic syndromes ([Cardeña & Classen, in press](#)). Finally, using cut-off scores of questionnaires as indicators of an actual diagnosis may obscure the fact that a full clinical evaluation is necessary to establish a diagnosis.

Future work

Although the SASRQ has been used mostly as a global measure, a very promising research path will be to evaluate whether distinct items or subscales differentially predict distinct types of ASD and PTSD (cf [Ellickson-Larew, Escarfulleri & Wolf, 2020.](#)), and investigate the processes through which acute reactions become entrenched as long-term maladjustment, or may be prevented from doing so. Results with new statistical techniques such as Network Analysis suggest that dismantling SASRQ components will provide a better view of which types of symptoms or subscales are likely to predict long term maladjustment, rather than just using overall scores (e.g., [Cardeña, Gusić & Cervin, 2021](#)). An emphasis on symptoms/reactions, rather than diagnoses may illuminate how transdiagnostic problems such as disturbed sleep ([Harvey, 2008](#)) interact with posttraumatic reactions such as dissociation. In the applied side, research using the SASRQ (or items from it) as initial or ongoing markers of clinical status and progress would be most welcome. In any event, this review shows consistent good psychometric properties of the SASRQ as a measure of posttraumatic distress and, more arguably, ASD.

Declarations of Competing Interest

All authors participated in designing and conducting the research and preparing the article. All authors have approved the final article version.

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