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Development and Psychometric Validation of the Self-Administered Stress Questionnaire (SASQ) Among NCR Employees

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Abstract
The assessment of occupational stress requires valid, reliable instruments suited to the specific socio-cultural context in which they are applied. This study presents the development and psychometric validation of the Self-Administered Stress Questionnaire (SASQ), a 19-item tool designed to assess job-related stress among employees in India's National Capital Region (NCR). The instrument was developed through a rigorous, theory-driven process and subjected to reliability testing, Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA). A sample of 392 employees participated in the validation phase. The SASQ demonstrated strong internal consistency (Cronbach's alpha = 0.954), robust factor structure, and good model fit indices in CFA. Four underlying constructs were identified: Work Demands and Workload, Organizational Structure and Support, Recognition and Rewards, and Work-Life Balance and Well-being. The findings support the SASQ as a valid and reliable instrument for assessing occupational stress in organizational settings across the NCR.

Keywords
Occupational stress, questionnaire development, SASQ, reliability, validity, EFA, CFA, NCR employees, workplace stress

Introduction
Work-related stress has emerged as a pressing concern in modern workplaces, with wide-ranging consequences for both individual health and organizational efficiency. (Karasek & Theorell, 1990). Rapid urbanization, increasing performance expectations, job insecurity, and an imbalance between personal and professional responsibilities have intensified stress levels among employees. These dynamics are particularly pronounced in India's National Capital Region (NCR), a hub of commercial activity with a diverse, competitive workforce.
Stress is known to affect not only the psychological and physical well-being of employees but also organizational productivity, efficiency, and morale (Leka et al., 2003). Consequently, there has been a growing need for robust, culturally appropriate tools to assess workplace stress effectively.

Despite the global recognition of occupational stress, there exists a shortage of culturally sensitive and contextually relevant tools in India that measure stress comprehensively and reliably. Most existing instruments were developed in Western settings and may not adequately reflect the socio-organizational nuances of Indian workplaces. Although standardized instruments such as the Perceived Stress Scale (PSS; Cohen et al., 1983) and the Depression, Anxiety, and Stress Scales (DASS; Lovibond & Lovibond, 1995) are widely used, these tools often lack contextual relevance and specificity when applied to diverse regional workforces such as those in NCR. The SASQ uniquely addresses the need for self-assessment

by allowing respondents to evaluate their own experiences of stress, a feature not commonly offered by existing instruments. By capturing the respondent's own perspective, the SASQ offers a more nuanced and authentic understanding of occupational stress compared to traditional assessment tools.

The present study addresses this gap by developing and validating the Self-Administered Stress Questionnaire (SASQ). The SASQ is specifically designed to measure occupational stress in a wide range of organizational environments in NCR. The study focuses solely on the development, reliability, and validation of the SASQ using rigorous quantitative techniques, namely Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA).

Literature Review

Stress is a multidimensional phenomenon that impacts individuals across various facets of life, particularly within workplace environments. The increasing demands of modern organizations, coupled with socio-economic challenges and technological advancements, have significantly amplified occupational stress (Leka, Griffiths, & Cox, 2003). Job stress has been recognized as a major contributor to employee dissatisfaction, low productivity, absenteeism, and health-related issues (Lazarus & Folkman, 1984; Ganster & Rosen, 2013). Given the extensive consequences, the development of reliable and valid measurement tools is critical to assess stress comprehensively.

Numerous psychological tools have been developed to assess stress. Instruments like the Perceived Stress Scale (PSS) developed by Cohen et al. (1983) and the Depression Anxiety Stress Scales (DASS) by Lovibond and Lovibond (1995) are widely used. However, these tools often measure general or clinical stress levels and may lack specificity in capturing workplace-related stressors that vary by region, profession, or socio-cultural context. As such, the development of context-specific tools, like the Self-Administered Stress Questionnaire (SASQ), becomes essential, especially in regions like the National Capital Region (NCR) of India where job stress is influenced by urban density, competition, long working hours, and organizational dynamics (Sahni, 2016).

Stress questionnaires typically assess various domains such as work demands, role clarity, interpersonal relationships, organizational structure, compensation, work-life balance, and health. The Job Stress Survey (JSS) by Spielberger and Vagg (1999) emphasizes job pressure and lack of support. Similarly, the Occupational Stress Indicator (OSI) developed by Cooper et al. (1988) measures job stress across six dimensions including job satisfaction, organizational climate, and coping strategies. However, many of these tools are developed in Western contexts and may not be directly applicable to Indian organizational settings due to socio-cultural differences.

The SASQ, as developed in this study, seeks to bridge this gap by focusing on key constructs relevant to Indian employees. It integrates stressors such as excessive workload, unclear organizational structure, lack of decision-making autonomy, interpersonal conflicts, and insufficient compensation—all prevalent in Indian corporate and public sector settings (Kumar & Rooprai, 2009).

Research emphasizes the need for cultural adaptation in psychometric tools to enhance relevance and validity (Van de Vijver & Tanzer, 2004). In India, the diverse socio-economic background, hierarchical corporate structures, and collectivist culture necessitate tailored tools that capture local stress dimensions (Budhwar & Varma, 2010). The SASQ is uniquely positioned to address these issues as it was designed after extensive review of stress constructs and consultation with HR professionals in NCR.

Psychometric validation involves assessing the internal consistency, construct validity, and reliability of a tool. Cronbach's alpha is widely used to evaluate internal consistency. A value above 0.70 is generally acceptable (Nunnally & Bernstein, 1994). The SASQ demonstrated high internal consistency with an overall Cronbach's alpha of 0.954.

Exploratory Factor Analysis (EFA) is employed to identify the underlying structure of a questionnaire and explore the relationships between observed variables (Costello & Osborne, 2005). In this study, EFA revealed four principal domains: work demands and workload, organizational structure and support, recognition and rewards, and work-life balance and well-being. The high Kaiser-Meyer-Olkin (KMO) value of 0.930 and the significant Bartlett's Test of Sphericity confirmed data suitability for factor analysis.

Confirmatory Factor Analysis (CFA) is then used to confirm the structure identified by EFA and test the model fit (Brown, 2015). In this study, CFA yielded satisfactory model fit indices: CMIN/df = 2.14, CFI = 0.942, TLI = 0.930, RMSEA = 0.054, and SRMR = 0.048, all indicating a good fit as per standard psychometric criteria (Hu & Bentler, 1999).
Studies focused on employees in NCR reveal that job stress is a significant concern, particularly in high-pressure sectors like IT, BPO, education, and banking (Sharma & Khera, 2015). Common stressors include long working hours, unrealistic performance expectations, lack of recognition, and poor organizational support. These findings further affirm the need for a comprehensive, reliable, and culturally relevant tool like the SASQ.

Instrument Development

Conceptual Foundation

The development of the SASQ was grounded in established theories of occupational stress, including the Job Demand-Control model (Karasek, 1979) and the Effort-Reward Imbalance model (Siegrist, 1996). These models highlight key stress domains such as workload, organizational support, recognition, and the interface between work and personal life. Based on these conceptual models and a thorough review of literature and existing instruments, an initial pool of items was generated.

Construction of the Questionnaire

The Self-Administered Stress Questionnaire (SASQ) comprises a total of 19 items, systematically divided into two main parts to facilitate a comprehensive assessment of workplace stress. Part A includes 18 close-ended items designed to identify potential sources of stress in the work environment. These items are rated using a 3-point Likert scale with response options: Yes (2), Neutral (1), and No (0). This section serves as a screening tool to determine the presence or absence of specific stressors, based on inputs derived from literature reviews, expert consultations with occupational psychologists, and HR professionals, as well as preliminary interviews with employees across various sectors in the National Capital Region (NCR). The simplified response format was intentionally selected to

minimize cognitive burden and respondent fatigue while ensuring clarity in identifying the relevance of each stressor. Notably, only those items marked "Yes" in Part A require further elaboration in Part B, ensuring the instrument remains efficient and targeted.

Part B directly mirrors the 18 items from Part A but reframes them to assess the degree of stress experienced by the respondent. This section employs a 5-point Likert scale ranging from 0 (Not stressful) to 4 (Extremely stressful), thereby capturing the intensity of perceived stress across different dimensions. The scale anchors—0 = Not stressful, 1 = Mildly stressful, 2 = Moderately stressful, 3 = Considerably stressful, and 4 = Extremely stressful—facilitate nuanced measurement, with total possible scores ranging from 0 to 72. This quantitative approach allows for detailed statistical analysis of stress severity among employees. The final item of the SASQ, the 19th, is an open-ended question: "How do you think your job stress can be reduced?" This qualitative component was included to gather employees' perspectives on stress management strategies, offering deeper, context-specific insights that structured responses alone could not capture. Thematic analysis of these responses revealed recurring themes such as organizational policy reforms, equitable workload distribution, enhanced employee wellness programs, and improved interpersonal communication. Collectively, the dual-format structure of the SASQ—combining close-ended and open-ended items—ensures a robust and multidimensional evaluation of occupational stress among employees.

Research Methodology

The study sample comprised 392 employees from various industries across NCR, including information technology, healthcare, education, retail, and public sector organizations. The sample was selected using stratified random sampling to ensure representation from different sectors and job levels.

Participants ranged in age from 18 to 55 years. Both genders were represented, and roles varied from junior executives to senior managers. Participation was voluntary and anonymous, with informed consent obtained.

Data were collected using the final 19-item version of the SASQ, administered through both online and paper-based formats. The survey was conducted over four weeks, ensuring a broad response base and data integrity. Responses were compiled and analyzed using SPSS software.

Analysis Techniques

The psychometric evaluation included:

- Descriptive statistics and normality checks
- Reliability analysis (Cronbach's Alpha, split-half testing)
- Sampling adequacy tests (KMO and Bartlett's Test)
- Exploratory Factor Analysis (EFA) for item grouping
- Confirmatory Factor Analysis (CFA) for model validation

Results

Each item in Part A is scored from **0 to 2**, and each corresponding item in Part B is scored from **0 to 4**. The total score from Part B can range between **0 to 72**, with higher scores indicating greater stress levels. This rigorously developed questionnaire thus serves as a

psychometrically sound instrument for assessing the multifaceted nature of job stress among employees.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded a value of 0.930, indicating excellent suitability of the data for factor analysis. This high KMO value reflects a strong degree of shared variance among variables, confirming that the dataset is appropriate for structure detection. Additionally, Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 5820.921$, df = 153, $p < 0.001$), demonstrating that the correlation matrix significantly differs from an identity matrix. This implies that the variables are sufficiently interrelated to justify the application of factor analysis. Together, these results provide robust support for proceeding with factor analysis to uncover the latent structure within the dataset.

To validate the underlying factor structure identified through Exploratory Factor Analysis (EFA), a Confirmatory Factor Analysis (CFA) was subsequently conducted using AMOS version 24. The objective of the CFA was to assess the goodness-of-fit of the hypothesized measurement model and to confirm the factorial validity of the Self-Administered Stress Questionnaire (SASQ). The measurement model consisted of four latent constructs, each representing a distinct dimension of job stress, as revealed through the EFA.

The first latent construct, Work Demands and Workload, was measured by five observed items that captured employees' perceptions of excessive work pressure, unrealistic deadlines, and task overload. The second construct, Organizational Structure and Support, comprised six items focusing on issues such as clarity of roles, communication flow, management support, and access to necessary resources within the organization. The third construct, Recognition and Rewards, included three items that assessed the adequacy and fairness of appreciation, incentives, and career advancement opportunities. The fourth and final construct, Work-Life Balance and Well-Being, was measured by four items that explored employees' ability to balance personal and professional responsibilities and their overall sense of mental and emotional well-being.

In the CFA model, all four latent variables were allowed to correlate freely, acknowledging the theoretical assumption that various sources of workplace stress are interrelated rather than independent. This approach enabled the assessment of both individual factor loadings and the overall model fit, contributing to the validation of the multidimensional structure of the SASQ. The analysis aimed to confirm whether the observed variables adequately reflected their corresponding latent constructs and whether the proposed model was a good representation of the empirical data.

The internal consistency and reliability of the SASQ were evaluated using Cronbach's alpha and split-half reliability tests.

Measure	**Value**
Cronbach's Alpha (overall)	0.954
Cronbach's Alpha Part 1 (Items 1–9)	0.932
Cronbach's Alpha Part 2 (Items 10–18)	0.915
Spearman-Brown Coefficient	0.903

Measure	Value
Guttman Split-Half Coefficient	0.899
Correlation Between Forms	0.823

The Cronbach's alpha coefficient for the 18 stress-related items was calculated to be 0.954, indicating an exceptionally high level of internal consistency. According to George and Mallery (2003), alpha values above 0.9 are considered excellent, suggesting that the items within the scale reliably measure the same underlying construct—perceived stress. Internal consistency reflects the extent to which all items in a scale are interrelated and collectively assess a single concept. In this case, the high alpha value implies that the items are strongly correlated with one another, meaning that respondents who rated one item highly were likely to rate other related items similarly. This level of reliability demonstrates that the questionnaire consistently captures the stress experiences of employees and can be confidently used as a reliable tool for assessing occupational stress. The split-half reliability analysis demonstrates that the stress measurement questionnaire has strong internal consistency across both halves. The high Cronbach's Alpha values for each half, combined with the strong correlation between the forms and high Spearman-Brown and Guttman coefficients, indicate that the questionnaire is reliable and that both halves contribute equally to the overall measurement of stress.

As discussed earlier due to the 19th question being an open-ended question, this scale is developed and validated based on both the quantitative and the qualitative method.
The 19th question "How do you think your job stress can be reduced?" is an open-ended question asked in the last of the questionnaire to find out probable answers from the respondents themselves and have a true view point of the employees on the topic. It is analysed by identifying common themes or patterns. For instance, if multiple respondents mention that "more flexible working hours" or "better management" could reduce job stress, these could be coded as recurring themes. Manual coding is done by reading each response and categorising it accordingly for example, Work-life balance (mention of flexible hours, time off, etc.), Management support (better communication, clear expectations), Workload reduction (fewer tasks, more resources), Psychological support (access to counsellors, wellness programs) etc.

Conclusion

The Self-Administered Stress Questionnaire (SASQ) exhibits strong psychometric properties, affirming its reliability and validity as a tool for assessing job-related stress. The instrument demonstrates excellent internal consistency, with a Cronbach's alpha of 0.954, indicating a high degree of coherence among the 18 stress-related items. Construct validity is well-supported by a Kaiser-Meyer-Olkin (KMO) value of 0.930 and a highly significant Bartlett's Test of Sphericity ($p < 0.001$), confirming the suitability of the data for factor analysis. Additionally, the split-half reliability, as measured by the Spearman-Brown coefficient, was 0.903, further reinforcing the scale's robustness.

The SASQ is both theoretically grounded and statistically validated, making it particularly suitable for evaluating occupational stress among employees in the National Capital Region (NCR). Its innovative dual-part structure enhances its utility by providing a comprehensive approach: Part A identifies the presence of specific workplace stressors, while Part B

measures the perceived intensity of those stressors. The inclusion of an open-ended item adds depth by capturing qualitative insights into employees' perspectives on stress reduction strategies. Overall, the SASQ emerges as a reliable, valid, and contextually appropriate instrument for use in both organizational settings and academic research.

The SASQ offers a valid and reliable instrument for assessing occupational stress. Developed through a rigorous, data-driven process, it effectively captures multiple dimensions of stress relevant to employees working in the dynamic environment of NCR.

The results from both EFA and CFA confirm the construct validity of the scale. The internal consistency is strong, and the factor structure is stable. As such, the SASQ stands as a valuable tool for researchers, psychologists, and HR professionals seeking to understand and mitigate stress in the workplace.

Recommendations

1. **Practical Use**: The SASQ may be incorporated into routine HR wellness surveys, exit interviews, and stress audits.
2. **Further Validation**: Future research may validate the SASQ across different geographical regions and industrial sectors.
3. **Longitudinal Application**: The SASQ can be used in pre-post evaluations of workplace interventions related to mental health or stress reduction.
4. **Translation and Adaptation**: Translations into regional Indian languages may further expand its applicability across diverse workforce groups.

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