Do gender and age affect an individual's sense of coherence? an environmental psychology perspective of flood survivals in Indonesia

H Maulana\(^1\)*, G Gumelar\(^1\), G Irianda\(^1\)

1 Faculty of Psychology, Universitas Negeri Jakarta, Rawamangun Muka Street, East Jakarta, Indonesia

herdiyan-maulana@unj.ac.id

Abstract. There is substantial evidence that in the aftermath of a disaster, an individual's sense of coherence (SOC) plays an important role in promoting one's sense of well-being. The SOC is regarded as a core component of the salutogenic model of mental health. Disaster survivors are frequently subjected to traumatic experience and have higher psychological distress prevalence rates than people in the general population. The present study aimed to investigate possible socio-demographic differences (gender and age) on the sense of coherence (SOC) among disaster survivors in Indonesia. A total of 194 respondents (71 male and 123 females) from across the country participated in the online survey. A factorial ANOVA using JASP was conducted to investigate the main effects of gender and age groups and the interaction effect of these variables on the SOC level. The findings were two folds, age group variance was significantly associated with the SOC, while gender did not significantly associate with the SOC. The main effect of Age groups was F (2, 962.773) = 4.307, \(p = 0.005\), indicating a significant difference of SOC between young adult, middle adult, and late adult groups. Theoretical implications and future direction of this study are discussed.

1. Introduction
The science of psychology is uniquely equipped to explain and understand the human dimensions of environmental problems. The environmental psychology perspective may assist stakeholders (policymakers, environmental researchers, and health expertise) in forming an applicable behavioral intervention as well as a sustainable development policy. Further, the environmental psychology perspective helps policymakers accurately understand the problem from a behavioral standpoint [1]. The salutogenesis approach is seen as one of the important theoretical approaches used to understand how individuals interact with their environment, including responding to post-disaster conditions. This theoretical approach suggests that, instead of focusing on negative psychological states (illness), people should pay their primary attention to positive thinking (well-being) in the face of adversity. Antonovsky (1979) shows the best concept that describes the salutogenesis approach is the Sense of coherence (SOC) [2]. In general, SOC is an individual's orientation about the world. A high score on SOC indicates people's thinking that focuses on an aspiration for positive and optimal experiences rather than challenge and negative psychological remarks [3]. Antonovsky (1979) suggests that people with high SOC score has the ability to find a suitable coping strategy to a particular situation and likely to resolve that problem.
effectively [2]. On the other hand, people with fewer SOC scores are likely to perceive a challenging situation as threatening, leading to a negative psychological response.

Numerous empirical evidence indicates that people exposed to a traumatic experience in a disaster could lead to a high level of post-traumatic stress [4,5]. Guilaran, et al. (2018) suggest that disaster is experienced in both personal and collective stages, impacting people at individual and community levels [6]. In particular, to flood, a classic study by Phifer J (1990) [7] showed that adult flood survivors were vulnerable to high negative psychological and physical symptoms. The flood experience was associated with an increase in anxiety, depression and psychosomatic problems, even though the incident happened a year ago [7]. A most recent study by Dai et al. (2017) [8] indicating that flood survivors were likely to have a common long-term adverse psychological problem. Particularly to female survivors who experienced recurrent flood incidents, less social support levels, and unstable emotional [8]. While in the other study, males with less salary level, lower occupational status and age between 55-64 were significantly prone to psychological issues [7].

Apart from negative outcomes, the disasters may also associate with the positive psychological outcome, such as observed in the community who respond and help each other [9-11]. Previous studies showed that social supports were positively correlated with positive psychological outcomes in the aftermath of the disaster [12]. They explained the way social supports positively associated with less negative psychological symptoms. Firstly, people who perceived social supports are the recipients of the actual assistance. This feeling would lead to the perception of the availability of supports, which may lead to collective action from other group members to consolidate their assistance to others. These processes are considered to make a unique contribution for people to find a better coping strategy in the aftermath of the disaster. Another positive outcome that might be taking place after the disaster is resilience. Mittelmark et al. (2017) suggest that people with high SOC have the ability to handle stress based on available psychological and social resources. SOC is a combination between one's sense of optimism and control [2]. Higher SOC would benefit people at taking the exposed stressor's risk and likely to appraise, thus stressors as a non-threatening experience.

Previous studies have rendered support on the association between socio-demographic status and SOC. Nilson et al. (2010) showed that adults (>30 years-old) are likely to have stable and higher SOC than those below 30 years-old [13]. While Lundberg (1997) proved that people in their young to middle age who had the greatest SOC level compare those in late adulthood [14]. However, other studies in the Scandinavian country, showing that SOC was increased along with the advancing of people's age [15]. Instead of comparing the SOC based on age, the initial theory by [3] suggests that SOC would remain stable overage. As such, individuals with stronger SOC at a young age would likely have better SOC when they are getting older.

Hittner J B (2007) indicates that the SOC score holds equally for male and female respondents [16]. It means that there were no differences in SOC across gender groups. Similarly, Volanen et al. (2007), in his longitudinal study on the Scandinavian sample, also suggesting that there were no specific differences in SOC across male and female participants [17]. However, other studies tend to point in different directions. For example, previous research recognized that males have higher SOC compare to females [17]. While there are abundant studies on the associations between SOC and other psychological variables, SOC's socio-demographic factors have been much less examined. Hence, some other studies indicated no correlation between age and gender to the SOC level [18]. Nevertheless, based on the earlier empirical findings above, it is evident that the relationship between age and SOC are somewhat unclear and contradictory. Furthermore, a limited study aimed to investigate the difference based on the SOC level based on demographic variables using the Indonesian sample.

This study aimed to investigate whether gender and age differences were associated with the SOC level across Indonesia's flood survivors. This aim will be achieved by addressing the following hypotheses; H1: There will be a significant difference in SOC level based on gender (male and female) variance; H2: There will be a significant difference in SOC level based on age group (Young, Middle, and Late adult) variance.
2. Methodology

2.1. Sample
A total of 194 participants who have experienced flooding voluntarily participated in this study. Participants' personal information (e.g., name, address, phone) was not provided to ensure confidentiality. The participants were recruited through an online survey. The participants were also asked for their consent prior to the questionnaire session. The convenience sampling was used to reach participants within the inclusion criteria.

2.2. Measures
Demographic information battery consists of the participant's age, gender, educational background, and living place. A question asking whether they have experienced flooding in the previous year was asked to ensure participants meet the inclusion criteria. The perceived risk of the flood was measured by the modified risk perception scale [19]. The scale consists of 13 items asking the participant's perception of the risk of flood. The plate comprises four sub-scales measuring each dimension of risk; possibility (item 1 to item 6), worry (thing 7 to item 9), controllability (item 10 & item 11) and resilience (item 12 & Item 13). The participants used a 5-point Likert scale (1 = strongly not agree to 5 = strongly agree) to indicate the degree of risk perception. The original scale was translated into Indonesians. The scale has been reported to have an acceptable internal consistency (Cronbach's alpha = .73) [19]. Analysis of reliability based on the present study indicates the Cronbach's alpha of the scale to be .76, and its dimensions were .75, .85, .57, and .66, respectively, indicating a moderate to high-reliability level. The Sense of coherence was measured using the 13 item version of SOC Scale, comprising three main dimensions; comprehensibility, manageability, and meaningfulness [20]. A semantic scale of 1 to 7 points (1 = never have the feeling to 7 = always have the feeling) was used to indicate the respondent's feelings about the questions/statements. A total SOC score was obtained by summing all the score answers ranging from 13 to 91. A higher score indicates a participant's higher sense of coherence. The scale has been initially tested across cultures and available in 49 different languages. The author developed the Indonesian version of the scale using translation and back-translation protocol [22]. The authors using Cronbach’s alpha to examine scale validity and further checking the scale factorial validity using the Exploratory Factor Analysis (EFA). The Sense of community (SOCM) was measured using the Brief Sense of Community Scale (BSCS) developed by Peterson et al. (2008) [22]. This scale consists of 8 items using a 5-point Likert-type response ranging from 1 = strongly disagree to 5 = strongly agree. Respondent was asked to respond to a question about their community/neighborhood (e.g., "I can get what I need in this neighborhood"). Reliability analysis based on the present study indicated the Cronbach's alpha for the Indonesian version of the scale to be .85, indicating satisfactory internal consistency. Social trust was measured using the General Trust Scale (GTS) developed by Jovanović (2016) [23]. The GTS comprises two different trust orientations: interpersonal trust and institutional trust. All items were rated on an 11-point Likert scale, ranging from 0 (not trust at all) to 10 (confidence ultimately). This scale has been translated and adapted into the Indonesian language and cultural context. Reliability analysis is based on this study showing the scale's good psychometric properties (Cronbach's = .88).

2.3. Analysis
A Factorial (two-way) ANOVA was conducted to compare the main effect of Gender and Age group (IV) different and the interaction effect of these variables on Sense of Coherence (DV). The authors using an open-source statistical software program JASP to conduct Factorial ANOVA analysis. A set of dummy variables of gender (1 = male, 0 = female) and age group (1 = young adult, 2 = middle adult, 3 = late adult) were prepared to test whether gender and age group associated with the SOC level.
3. Results and discussion

3.1. Demographic results
There were no missing values in the data. The SOC scale was checked for validity and reliability by using the Cronbach alpha coefficient. Data were also subjected to standard statistical assumption checks, including normality, linearity, and homogeneity. The sample characteristics were 64% female and 36%, male. Most participants came from the young adulthood group (71%), while the Middle and Late adulthood were 27% and 2%, respectively. Details of information on sample characteristics were presented in table 1 below.

| Characteristic            | Distribution N (%) |
|---------------------------|--------------------|
| Gender                    |                    |
| Female                    | 123 (64 %)         |
| Male                      | 71 (36 %)          |
| Age group                 |                    |
| Young adult (18-28 years-old) | 122 (71%)     |
| Middle adult (29-40 years-old) | 41 (27%)      |
| Late adult (41-65 years-old) | 31 (2%)         |
| Highest education         |                    |
| Junior high school        | 4 (2%)             |
| Senior high school        | 70 (36%)           |
| Undergraduate             | 85 (44%)           |
| Post-graduate             | 32 (17%)           |
| Not answer                | 3 (1%)             |

3.2. Assumption testing results
The assumption test on data homogeneity was checked using the Levine test. Levine’s test indicated equal variances among the sample (F = 2.170, p = .060) and the alternative hypothesis (there is variance difference) is accepted (p > .05), which indicating the assumption of homogeneity of variance is meet.

3.3. Hypothesis testing results
A two-way analysis of variance was conducted on the influence of two independent variables (Gender & Age) on the SOC level among flood survivors in Indonesia. Gender included males and females, and age consisted of three groups (young, middle, and late). As seen in figure 1 below, our Factorial ANOVA analysis showed that only the age group effect was statistically significant at the .05 (p = .01) significance level. At the same time, the difference between males and females did not significantly associate with the SOC. The main effect for age group yielded an F ratio of F (2,4,307) = 962.773, p < .05, indicating a significant difference of SOC between young adult group (M= 49.375, SD= 17.68), middle adult group (M= 40.154, SD= 17.12), and late adult group (M= 46.563, SD= 18.38). The marginal means table results below (table 2) confirmed that SOC scores were reported significantly different when the age group was considered but not age.
Figure 1. The descriptive plot of independent variables (gender and age group).

Table 2. Marginal means of factorial analysis variance.

| Sense of coherence score | Age group       |         |         |         |
|--------------------------|-----------------|---------|---------|---------|
|                          | Young adult     | Middle adult | Late adult |
| Gender                   | Male            | 44.375  | 40.154  | 46.563  |
|                          | Female          | 49.867  | 44.333  | 37.750  |

Post-hoc analysis was run to inform about which levels within the age group variable were significant. Post hoc testing using Tukey's correction revealed that the Young adult group resulted in significantly greater SOC levels than other age groups (p<.05). There were no significant differences in the SOC level between the Middle adult group and the Late adult group. As seen in figure 2 below, the SOC score was high for the young age group. Hence it was a great difference when it was compared with the middle and late age groups.

Figure 2. The descriptive plot of age group to a sense of coherence score.

This current finding did not support the first hypothesis, as evidence that gender difference (male and female) did not significantly associate with the SOC level. Such association seems parallel to existing literature. It means that being male or female did not affect the sense of coherence. However,
the finding supports the second hypothesis of the study that age group variance was reported with the SOC level. Age differences were significantly associated with different levels of SOC. Our finding suggests that the young adult age group was having a higher SOC level compared to the other age group members (middle and late adult). This finding is consistent with previous findings, which indicate that SOC is a stable variable over time. Regular and extraordinary life events (including exposure to disaster) contribute to the initial one's SOC level. Antonovsky (1979) suggests that SOC is developed during the period of early life (childhood and adolescence), and it is going stabilized around the age of middle adulthood [2]. Subsequently, once people are getting into the middle to late adulthood period, the SOC becomes relatively difficult to change.

4. Conclusion
This study aimed to examine the gender and age difference in the Sense of coherence level. Our analysis finding suggests that only age group differences that significantly associated with the SOC level. A high level of coherence was identified as a key factor contributing to a lower perception of risk and low anxiety levels. Therefore, it is important to consider the age difference as a factor contributing to SOC. Future studies should consider advanced analysis using experimental or longitudinal approaches, offering a more comprehensive understanding across variables.

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