2.36 ASSESSING HUMAN DIMENSIONS OF WEATHER AND CLIMATE SALIENCE

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1. Introduction

This project describes the development and validation of a psychological measurement tool, the Weather Salience Questionnaire (WxSQ) that assesses the extent to which people find the weather and climate to be salient to their lives. The salience of weather and climate information should be studied because anecdotal observations suggested that people differ with regard to the significance that weather and climate occupy in their lives. Further, weather salience may affect the extent to which people seek and use weather-related information during hazardous or severe weather events. It was expected that people who find weather and climate conditions salient in their lives should indicate this salience in various ways that could include: search and use of weather-related information from various forms of communication media, attention to weather and climate conditions in one's locale, sensitivity to the effects of weather on one's emotional state and behavioral activities, and the effects of weather and climate on the tasks of daily living. Other indicators of salience could include the degree psychological attachment people have for the climatic conditions in their locales as well as the need to experience changes and variety in weather and climate conditions. The author's purpose in this project was to create a measure of weather and climate salience, to examine the technical properties of such a measure, and to assess its validity by correlating it with other factual or experiential data that people reported about their weather experiences.

2. Development of the Weather Salience Questionnaire (WxSQ)

The author, a researcher in counseling psychology with a longtime interest in weather and climate, developed the 53 items of the WxSQ.

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The content of the items stemmed from information gathered in interactions with clients and students regarding their general orientation to weather and climate. The author created the items to reflect the many different ways that people may find aspects of weather and climate significant in their lives. The item content addressed: 1. peoples' weather/climate information-seeking behaviors, 2. their use of information they directly observed from the atmosphere, 3. the extent to which weather/climate affect their moods, 4. their attachment and preference for particular weather conditions, 5. their perceptions of weather changes and variability in weather, 6. and the effects of weather changes on their activities of daily life. Each item was evaluated using a five-point rating scale that indicated the frequency of a weather-related behavior (*1 = Never to 5 = Always*) or degree of agreement (*1 = Strongly disagree to 5 = Strongly agree*) with the statement.

3. Participants & Methodology

The participants for this research project were 292 undergraduate students from the University of Georgia who voluntarily responded to the WxSQ in exchange for course credit. The participants were 162 women and 132 men whose ages ranged from 18 to 40 years (M = 19.6 years, SD =1.93). The participants were primarily Caucasian American (89%), followed by African American (5%), Asian American (2%) and 4% Other. The WxSQ was administered online via the Internet along with several additional instruments that were part of a larger research project to explore how people experience weather and climate. The research participants also responded to questions regarding their demography, ownership and use of consumer weather instruments, and about various severe or threatening weather events that resulted in either damage to their or their family's property or to injuries they or their family members sustained (e. g., thunderstorms, tornadoes, hurricanes, ice storms, snow storms, etc.).

Statistical techniques employed in the development of psychological measures were used to evaluate the performance of the 53 items created for the WxSQ (Allen & Yen, 2002). Following from the discussion above, it was expected different facets or dimensions of weather salience would exist and that these would contribute to an overall or

general level of weather salience. Exploratory factor analysis (principal components extraction method, oblimin rotation) was used to identify the specific facets of weather salience contributed by the individual items in the WxSQ. These specific facets were then treated as subscales of the longer measure. Subsequent to factor analysis, the author calculated Cronbach's coefficient α to obtain an estimate of the internal consistency of items within each WxSQ subscale. Finally, t-tests of the differences between two independent means were used to assess differences in the total WxSQ scores or in the subscales according to factual or experiential information the respondents supplied regarding the role of weather or climate in affecting their lives.

3. Results – Dimensions of Weather Salience

Forty of the original 53 items were retained and used to create seven subscales for the WxSQ following the factor analysis. The content of the scales appears in Table 1. The eigenvalues from the factor analysis and the coefficient α's for each of the 7 scales appear in Table 2. Most of the subscales demonstrated good internal consistency reliability, indicating that each item was contributing to the measurement of a central theme within each subscale. In the cases where the internal consistencies were less than .80, the brevity of the subscales (between 3 to 5 items each) probably contributed to the decreased reliability. Overall, the α of .90 for the 40 items retained in the subscales of the WxSQ suggested that the subscales tapped facets of weather salience separately and that all of the items functioned together to assess the construct of weather salience.

Table 1: Content Assessed by the WxSQ

1. Seeking weather/climate information from multiple media and electronic sources (12 items)
2. Effects of weather (and changes in the weather) on mood state (5 items)
3. Observing and noting atmospheric conditions directly (i. e., in person) (9 items)
4. Psychological attachment to particular weather/climate conditions (3 items)
5. Need to observe or experience changes/variety in weather and climate (4 items)
6. Seeking weather information during the possibility of a weather-related holiday or closure (3 items)
7. Effects of weather (and weather changes) on activities of daily life (e. g., work, travel) (4 items)

Table 2: Eigenvalues and Coefficient α for the WxSQ

Subscale	Eigenvalue	Coefficient α
Seeking Info.	10.61	.88
Wx. Mood Effects	3.61	.86
Observing Wx.	2.98	.80
Wx. Attachment	2.58	.86
Wx. Variety	2.02	.68
Wx. Holiday	1.85	.72
Wx & Daily Life	1.72	.65
All Items	25.37	.90

The 7 subscales can be summed to provide an overall indication of the extent to which weather/climate are salient to people. Figure 1 depicts the distribution of total scores on the WxSQ. Overall, the scores were almost perfectly normally distributed (M = 129.9, SD = 15.3) with a median of 130 and a mode of 127. The minimum score in the sample was 61 and the maximum was 168 out of a scale maximum of 200. On the basis of these initial results following the development of the WxSQ items, it was concluded that the instrument demonstrated promise in assessing the extent to which weather and climate may be salient for people.

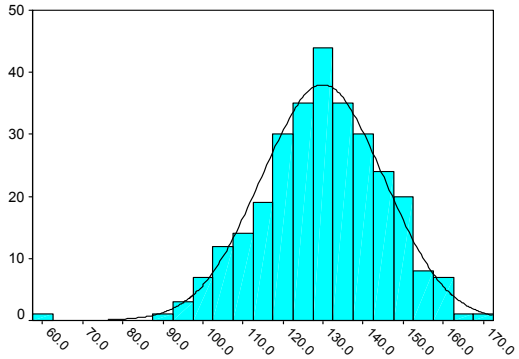

Figure 1: Score Distribution of the WxSQ

4. Results – Validity of the WxSQ

Several analyses were conducted to establish the WxSQ as a valid measure for the construct of weather salience. These analyses involved an examination of scores on the WxSQ in the context of

people's use of consumer weather instruments and their experiences with extreme weather events. Regarding use of instruments, the study participants were asked to indicate whether they had a thermometer at their home, apartment, or dorm room that they used to check the temperature. They also were asked about the presence and use of instruments other than thermometers. It was expected that if the WxSQ was measuring information of practical importance and significance then people with instruments would report a greater degree of weather salience. As expected, the 51 people who owned thermometers M = 135.9, SD = 12.6) reported significantly greater WxSQ total scores than people who did not, M = 128.6, SD = 12.5, t (290)= 3.13, p = .0019. Subscale differences also were observed in that people who owned thermometers (M = 32.2, SD = 5.6) reported significantly greater frequency of seeking and obtaining information from media and electronic sources than people who did not own thermometers, (M = 29.3, SD = 6.6), t (290) = 2.92, p = .0038. People who owned thermometers similarly reported a greater degree of directly observing and sensing weather conditions (M = 37.2, SD = 4.2) than people who did not own a thermometer (M = 35.1, SD = 4.4), t (290) = 3.60, p = .0024. The last subscale to show differences according to the use of a thermometer concerned the respondents' interests and needs to experience varying weather conditions. Those owning a thermometer (M = 14.1, SD = 2.2) reported a significantly greater degree of need for weather variety than people who did not (M = 12.9, SD = 2.1), t (93) = 3.24 , p = .0016.

There were 108 of the 290 respondents who indicated that they possessed weather instruments or equipment other than a thermometer that they used to obtain weather information. The author suspects that the greater number of people reporting the use of other instruments likely stemmed from their counting various media outlets (e. g., television, the internet) as sources of information. Nonetheless, it was again expected that if the WxSQ was a valid and practical indicator of salience then scores should differ according to the ownership or use of other instruments. As expected, the total WxSQ score was greater for people who reported using other instruments (M = 133.4, SD = 13.0) than for people who did not (M = 127.8, SD = 16.2), t (265) = 3.27, p = .0012. People who owned other instruments also more frequently sought out weather information from the media and other electronic sources (M = 32.1, SD = 5.3) than people who did not (M = 28.4, SD = 6.8), t (270) = 5.20, p < .0001. People owning or using other instruments (M = 10.9, SD = 2.8) reported that the weather affected their daily living activities to a significantly greater degree than those who did not own instruments (M = 10.1, SD = 2.8), t (290) = 2.21, p = .0278.

With respect to the experience of severe/extreme weather, it was again predicted that if the WxSQ was measuring salience in a manner that was of practical significance then people who previously experienced property damage from weather events would report a greater degree of weather salience via the WxSQ. As expected, people who indicated that they or their family members sustained property damage from: hurricanes, floods, thunderstorms, tornados, or winter storms (N = 215) reported a significantly higher WxSQ total score (M = 129.9, SD = 13.8) than people who did not experience weather-related damages (M = 120.7, SD = 18.0), t (109) = 3.08, p = .0026. People who experienced weather-related property damage (M = 35.4, SD = 3.9) also reported a significantly greater degree observing and sensing weather conditions than people who did not sustain such damage (M = 32.8, SD = 5.5), t (105) = 2.81, p = .0059. People who experience weather-related damage (M = 13.1, SD = 1.7) more frequently took note of the weather when there was the possibility of weather-related closures or holidays compared to people who did not sustain weather damage (M = 12.0, SD = 2.2), t (112) = 2.94, p = .004. Finally, people who experienced weather-related property damage (M = 10.3, SD = 2.7) indicated that weather and climate affected their day-to-day life more than people who did not experience weather-related damages (M = 9.0, SD = 3.0), t (290) = 2.71, p = .0071. An insufficient number of participants reported experiencing weather-related bodily injuries to examine weather salience according to differences on this variable.

5. Discussion and Conclusions

Several conclusions follow from the results of this research. First, it appears that the construct of weather salience is a multi-faceted one that can be measured by a set of written items to which people respond. These facets together all seem to assess the broad construct of weather salience. Second, like many human characteristics and abilities, it appears that the degree of weather salience is normally distributed among people. This means that some people will find the weather and climate of their surroundings something that is highly engaging

such that they are attuned to it on multiple levels. On the opposite end, other people seem not to be affected more than minimally by the weather and climate of their surroundings. Most other people are somewhere in the middle of these extremes.

A third conclusion is a tentative one awaiting further empirical support. That is, the WxSQ appears to be a valid measure for assessing weather salience to the extent that it does reflect moderate to strong statistical differences in peoples' use of weather instruments. Further, the WxSQ also reflects people's experiences of having their or their family's property damaged or destroyed by severe weather events. This point is especially noteworthy insofar as it has survival or adaptive implications. People who find weather and climate conditions salient may benefit or even survive by altering their behavior when they determine that threatening weather is approaching.

Overall, the concept of weather salience is significant because it bears upon the consumer-side of the use of weather and climate information. High quality weather and climate data exist (Strangeways, 2003), however people may fail either to seek such information or to implement behavior in response to the information depending upon the level of salience that they exhibit. The construct of weather salience may help explain why some people do not seek or use weather information when they should or when they could otherwise benefit from it.

Weather and climate salience as a focus of inquiry draws upon meteorology, climatology, psychology and sociology with respect to the variables studied and the possible relationships between the variables. Weather salience is significant because it represents one of many possible lines of programmatic research within a new field the author refers to as Behavioral Climatology (see Stewart 2004). Here, climatology remains the principal field because of its naturally integrative and multidisciplinary focus (Glanz, 2003). *Behavioral* denotes the sub-fields of inquiry as these relate to the broad and reciprocal relationships between climate on one hand and peoples' cognitive, behavioral, attitudinal, and emotional processes on the other.

The present study is limited in that it used undergraduate students from a university in the southeastern United States to study weather salience. Further efforts are being made to include a more heterogeneous sample of respondents to the WxSQ throughout the North American continent and elsewhere so that this instrument may be revised or supplemented according to the diverse ways in which people may orient themselves toward the weather and climate. Collaboration in collecting this data and in furthering the study of Behavioral Climatology would be welcomed.

6. References

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