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research ARTICLE

Stress and Occupation: Summer Research on the Road

—Lindsey Wetteland (Edited by Jennifer Lee)

During the summer of 2006, I studied the possible relations among perceived stress, daily occupations, and perceived health. I spent the months preceding the study refining a research protocol and working with my faculty mentor, Barbara Prudhomme White. When summer at last arrived, I spent a couple weeks redesigning an existing research tool called a card sort. Finally, I was ready to travel throughout New England and meet volunteer participants at their places of convenience, which most frequently were their kitchen tables. Toward the end of the summer, I found the extensive amount of data that I collected both exciting and challenging. I needed to narrow down the variables that I would be analyzing to those applicable to my study and original hypotheses—but there were so many interesting factors to consider. My research experience has been a journey of over a year, and it hasn't ended yet.

It All Started with South Africa

My undergraduate research experience began with a visit to the University of New Hampshire by Frank Kronenberg, the Dutch co-founder of Spirit of Survivors—Occupational Therapy without Borders (SOS-OTwB). This organization represents an international network of proactive occupational therapists who are committed to developing occupational therapy as a relevant and available resource to populations overlooked by the profession. During his lecture Mr. Kronenberg introduced terms such as *occupational deprivation* and *occupational justice*, which I've since discovered are focal points of a new wave of occupational therapy philosophy. *Occupational deprivation* refers to the loss or lack of occupations necessary for well-being and a satisfactory life (Cara & MacRae, 2005). *Occupational justice* is a perspective that promotes social, political, and economic change aimed at enabling people to meet their occupational potential and experience well-being (Spear & Crepeau, 2003). I was intrigued by these ideas. Occupations themselves are the things we do every day, but to consider *deprivation* of daily activities as a key element of impoverished people was a novel concept to me.

Soon after the lecture, I approached Dr. White to find out how I could learn more about SOS-OTwB and get involved with occupationally deprived populations. She proposed that it would be mutually beneficial to link my desire to work with Mr. Kronenberg to her research on stress. Such a collaboration and dialogue would also fulfill the UNH occupational therapy department's desire to develop international relationships with occupational therapists and occupational therapy schools around the world.

I worked closely and quickly with Dr. White to design a study that would allow me to work in South Africa and survey the impact of stress on occupational engagement. Unfortunately, correspondence with Mr. Kronenberg eventually made it apparent that arrangements for working in South Africa would take too long to complete. At this point, I was already excited about this new study on occupation, so I shifted my attention to New England and applied for and received a Summer Undergraduate Research Fellowship.

What is Occupation and Where's the Logic?

In the realm of occupational therapy, *occupations* are not jobs or employment; rather they are those activities that reflect cultural values and provide structure and meaning to living while at the same time meeting human needs for self-care, enjoyment, and social participation (Larson, Wood, & Clark, 2003). I like to think of occupations as *experiences*, which can be as active as making dinner for the kids or as passive as daydreaming or doodling in class. Occupational therapy also differentiates between occupations and *activities*. While occupations are acts carried out consciously and purposefully, the same acts, if routinely and automatically done, are termed activities. This study looked at both the occupations and activities in which people engage. The concept of goal-oriented occupation as an essential part of life and also as a facilitator of rehabilitation is the basis for occupational therapy as a practice and occupational science as an academic discipline.

Participation in meaningful occupations has been linked to improved health (Law, Steinwender, & Leclair, 1998). In order to experience health, people must engage in occupations that are meaningful, suited to their capabilities, provide opportunity for growth, and are flexible enough to change according to context and choice (Wilcock, 1998b). Stress is also strongly associated with health (McEwen & Lasely, 2002) and is conceptually linked with occupation. Dr. White and other occupational therapy/science researchers suspect that under chronic stress conditions, occupational engagement becomes limited; and daily necessity occupations, like eating and bathing, take precedent over a balanced occupational repertoire that includes leisure and social activities. Maintaining an extensive repertoire of occupations takes effort, so when under stress, energy may be conserved by restricting one's occupations to only the necessary activities of daily living (Wilcock, 1998a; Csikszentmihalyi, 1993).

The purpose of my summer pilot study was to investigate and analyze the possible relations between perceived stress levels, perceived health, and occupational repertoire. *Occupational repertoire* means the types, frequency, variety, and categories of occupations in which people engage. Examples of occupational categories are "harmful," "daily living" and "leisure." It seemed logical that stress levels, as well as illness, would impact occupational repertoire and that occupational repertoire would, in turn, impact stress and health. However, no research had been done to link occupational repertoire, levels of perceived stress, and overall health status. We hypothesized that increased perceived stress levels would correlate to limited occupational repertoire, decreased perceived health, and an increase in actual illness. We also predicted that increased perceived stress levels would correlate to an increase in participation in harmful occupations or health threatening behaviors such as drug and alcohol use.

Method to the Madness

When I finally began the summer research project, I had already worked closely with Dr. White for over six months. She sat with me for many hours writing proposals and protocols, and planning the details of the research project. Dr. White convinced me that I would be able to carry out this project and offered me her expertise, encouragement, and support throughout the entire process.

I spent the first few weeks of summer modifying an existing tool, the Activity Card Sort (Baum & Edwards, 2000), which is a set of 4 by 6-inch cards with names and pictures of occupations and activities. This card sort had been developed for use with the elderly and portrays typical occupations of that age group. I needed a more suitable, region-appropriate deck of cards with a wider range of occupation and activity options. Producing this new deck was a long job. I first came up with eighty-four suitable occupations, then spent two weeks on my laptop finding public domain pictures of people engaging in them. All the pictures had to be formatted to a uniform size and given a brief description such as "bicycling" or "going to the beach." (Fig. 1) Finally, I took them to a local copy store to be printed and laminated.

Fig. 1: "Going to the Beach" from the card sort



Going to the Beach

This card sort was key to my research project and would be used to gather information about how participants occupied their time. I would ask each volunteer participant to sort the cards into one of six categories of frequency of participation. Choices ranged from "Never Done and Don't Want To" to "Do Three Times a Week or More." This would show me the number, kinds and frequency of occupations in their occupational repertoire. Because the cards contained illegal occupations and activities such as drug use, each card was labeled on the back with a randomly assigned code. (Fig. 2)

Fig. 2: "Misuse of Prescription Drugs" from the card sort



Misuse of Prescription Drugs
(Ritalin, Adderall, Codeine, OxyContin, Percocet,
Valium, Demerol, etc.)

In private, participants sorted them face down into the frequency categories. Only the codes on the backs of the cards were showing when I returned to record the results. In this manner I made an effort to protect confidentiality.

After creating the new card sort, I developed a form to gather some brief demographic data and a perceived health questionnaire. The demographic data form, based on tax forms, asked for information such as income bracket and number of children in order to gather contextual information about each participant. We

developed the perceived health questionnaire according to what we wanted to know about each participant's perception of his/her health. In addition to questions about frequency of illness, participants were asked to rate their own health on a scale of 1-10 (10 being healthiest.) (See [Health Data](#)) To gather information about how participants perceived their levels of stress, I used a second questionnaire, the Perceived Stress 10-item Scale (Cohen & Williamson, 1988). The Perceived Stress Scale (PSS), a global measure of stress that ranges from 0 to 40, is well researched and widely used in social science studies. The PSS asks questions such as "In the last month, how often have you found that you could not cope with all the things that you had to do?" in order to gauge a person's feelings and thoughts. Participants' response choices range from "never" to "very often" to indicate how often they have felt a certain way in the past month. (See [Perceived Stress Scale-10 Item](#)) Both questionnaires are subjective measurements and, therefore, are labeled "perceived." All of the research instruments used were administered in such a way as to maintain anonymity and confidentiality. No names were ever recorded, and confidentiality risks associated with the card sort were avoided using the coding system.

Research is a Trip

Once the card sort and data collection forms were ready, it was time for me to start recruiting and surveying participants. I began recruiting through people I knew. The process moved slowly at first, while I waited for emails and phone calls confirming appointments and willingness to participate. Eventually, this snow-ball sampling method paid off and recruitment picked up. In snow-ball, or convenience, sampling, you start surveying friends of friends and rely on referrals from initial participants to generate additional recruits. This method is used by many behavioral and social science researchers in pilot studies to get an inexpensive estimate of what further, more extensive research may show. I ended up traveling all around New Hampshire, Maine, and Massachusetts to survey people.



Fig. 3: The author in Acadia National Park

On one occasion, I stayed a few days with a friend's ninety-two-year-old mother in the small town of Winter Harbor, Maine. I was very nervous about driving up to Maine alone, meeting and surveying strangers, and staying with my friend's mother, whom I had not met. When I pulled into her driveway, she came out to greet me and immediately served me homemade strawberry shortcake. My nervousness was alleviated then and there. The next day I surveyed a couple park rangers from Acadia National Park. Of course, I managed to squeeze in some hiking before going back to Winter Harbor to survey more participants. (Fig. 3) The following day I surveyed several more people who ended up inviting me to come back and stay "any time." The whole recruiting process was amazing. It allowed me to meet many people I never would otherwise have met. I found myself at many different kitchen tables because I would travel and meet participants where they felt most comfortable. The experience of being welcomed into so many homes could have been a study in itself.

At summer's end I had surveyed a sample comprised of sixty-four generally healthy and non-disabled participants (forty-five female, nineteen male) residing in or visiting Maine, New Hampshire or Massachusetts.

Participants were between the ages of eighteen and ninety-two, with a fairly even distribution. In order to focus on the effects of stress on occupational repertoire, I screened out participants with disabilities or age-related restrictions. Almost all participants came from white/Caucasian and middle class backgrounds, and 70% were female. Because of the short amount of time and the mostly female contacts with whom I started recruiting, I was not able to develop a diverse sample. I feel this is also partly due to New England's lack of racial diversity.

Making Sense of It

Once I had finished surveying the participants, I entered their data into a secure on-line database created for me by my computer-savvy boyfriend. The database converted the codes entered from the card sort into an array of occupations organized by frequency of participation. After a few days of data entry, the database files were converted into a format readable by SPSS, an analytic software program used to run correlation analyses and compute related statistics. It took me a few days to figure out SPSS, and I did some refresher reading on statistics, where, for example, I found I needed to use Spearman's correlation coefficient because of the nature of my assessment tools. Because I had acquired so much relevant and interesting data, it was difficult to narrow the variables I would examine and the scope of my analysis. I required a good deal of help from my mentor, Dr. White, during this period of analysis.

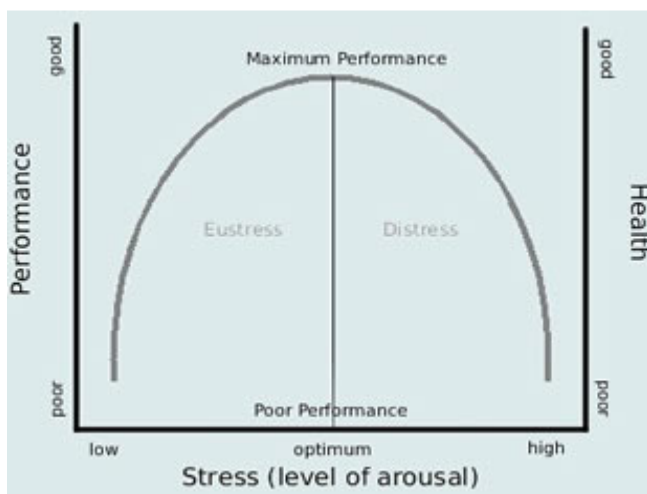


Fig. 4: Yerkes-Dodson Principle. Adapted from Seaward, B.L. (2006)

This summer's study shows several trends regarding stress, occupation, and health. Results neither support nor refute our hypothesis that increased perceived stress levels would correlate to a more limited occupational repertoire. However, they do indicate that participants falling in the normal range for stress experienced the largest occupational repertoire and better overall health. There is an optimum range of stress; too much stress takes a toll on our system and performance suffers, while too little leaves us feeling tired and unmotivated (Yerkes & Dodson, 1908).

The Yerkes-Dodson Principle is illustrated in Figure 4, where *eustress* refers to healthy stress that usually accompanies productive work and a sense of fulfillment; and *distress* refers to harmful stress resulting from a negative stressor or event. Both are cumulative and can be taxing on the body.

Findings do support our hypothesis that increased stress correlates to decreased perceived health and increased frequency of illness. In addition, my research suggests that participation in harmful occupations (like drug and alcohol use) increases the likelihood of becoming ill and lowers perceptions of health. Those who participate in harmful occupations are also more likely to participate in fewer activities of daily living. In Figure 5, correlations are shown in corresponding blocks between each variable in the left column and each variable in the top row. For example, the correlation (r) between Perceived Stress and Perceived Health is $-.381$. Only significant correlations are shown. In general terms, correlation coefficients up to 0.33 are considered to indicate weak relationships; those between 0.34 and 0.66 indicate medium strength relationships; and those over 0.67 indicate strong relationships.

	Perceived Stress	Perceived Health	Frequency of Colds and Illness	Participation in Harmful Occupations	Participation in Daily Living Occupations
Perceived Stress		$r_s = -.381^{**}$	$r_s = .281^*$	NS	NS
Perceived Health			$r_s = -.401^{**}$	$r_s = -.317^*$	NS
Frequency of Colds and Illness				$r_s = .298^*$	NS
Participation in Harmful Occupations					$r_s = .269^*$
Participation in Daily Living Occupations					

Fig 5: Correlations between Variables: $*=p > .05$ means the probability of error is less than 5%; $**p > .01$ means the probability of error is less than 1%. Correlation values of r range from +1 (perfect correlation), through 0 (no correlation), to -1 (perfect negative correlation.)

My research with Dr. White is ongoing, and the results of my summer's study emphasize the need for further research. However, the outcomes of my undergraduate research experience are not limited to research results. Chiefly, the modified card sort I created is currently being used in several new studies by the UNH occupational therapy department. The database designed by my boyfriend prompted Dr. White to contract with him to create a database that can be used with several research projects at once.

From carrying out the study, I've learned (mostly from trial and error) a lot about how to design a study, how to improve the card sort frequency categories, and how to network and recruit participants.

Finally are the "life lessons" of the past year. I've gained a good sense of what it is to conduct research and a better sense of myself as an occupational therapist. My confidence and curiosity have both benefited. I intend to continue seeking answers to my questions as I gather more data to expand and diversify my sample. With my help, additional investigators at UNH will be collecting data to add to the sample and provide more conclusive results.

This opportunity has been invaluable in my learning and forming relationships, and I am grateful to everyone who made it possible. I am particularly indebted to my faculty mentor, Dr. Barbara P. White, who has inspired and supported me from the beginning. I also thank James Unger for his ongoing encouragement and technical expertise.

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Health Data

Participant # _____

Please answer the following with consideration for your health over the past six months.

Do you eat breakfast on a regular basis? ___Yes ___No

Do you exercise regularly? ___Yes ___No

How often in the past month have you had a cold? _____

How often in the past month have you been sick with more than a cold? _____

How often in the past six months have you had a cold? _____

How often in the past six months have you been sick with more than a cold? _____

How often in the past month have you had to go to see a health professional for more than a routine check?

How often in the past six months have you had to go to see a health professional for more than a routine check?

On a scale from 1-10, where do you perceive your overall health? (please circle)

1 2 3 4 5 6 7 8 9 10
Very Unhealthy Very Healthy

Perceived Stress Scale–10 Item

Participant # _____

Instructions: The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

3. In the last month, how often have you felt nervous and "stressed"?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

5. In the last month, how often have you felt that things were going your way?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

7. In the last month, how often have you been able to control irritations in your life?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

8. In the last month, how often have you felt that you were on top of things?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

9. In the last month, how often have you been angered because of things that were outside of your control?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

Author Bio

Lindsey T. Wetteland first heard of occupational therapy (OT) when she was a freshman at a Florida college, which did not have an OT program. For her junior year, Lindsey, a native of Orlando, came north to enroll in the University of New Hampshire and will get her master of science in occupational therapy in the fall of 2007. Lindsey hopes in the future to make “a difference on a large scale” and sees research as a way to do it. “The effects of stress are becoming a major health concern in America,” she said, and more needs to be known about stress reduction therapies as well as ways to promote general health. Her research project taught her a great deal about the scientific method and systematic inquiry: it’s important to “put a lot of work and thought into the study design before you ever begin actual research.” Lindsey decided to publish in *Inquiry* because many people have misconceptions about occupational therapy and are not aware of the importance of meaningful occupation in our lives.

Mentor Bio

“It’s always inspiring working with students,” says Dr. **Barbara Prudhomme White**, who has mentored University of New Hampshire students for the McNair program as well as for various research projects. “I gain insight from seeing their growth in understanding research methods and from their excitement in uncovering new information.” Dr. White has been at UNH for over eight years and is an associate professor in the Occupational Department of the School for Health and Human Services. Her areas of interest and specialization are several: stress and relations to development in children; stress links to occupations and health; early intervention and behavioral and emotional regulation; and salivary biomarkers of stress. Dr. White was impressed with the growth in Lindsey’s research skills and self-confidence throughout the project. As Lindsey says in her article, Dr. White worked closely with her during her project and the revising of her report for *Inquiry*.