Repurposing Laughter in a Wearable Design for Social Interaction

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Abstract

This paper presents the potentials of laughter, a natural body expression that can elicit enjoyment and positive mood, as a body-hacking intervention on physical social isolation. We report on our exploratory research investigating how an audio-visual aesthetic for laughter on a wearable design can prompt a sensibility of social warmth and connectedness within a shared public space. Laughing Dress is a wearable responsive garment that displays light and audio representations of social distances based on physical distances and kinetic interactions between wearer and co-located participants. Through deconstructing and repurposing the body's organic composition of laughter, new perspectives on our human and social body, against other human entities are introduced in relation to our situated environment. This new paradigm of transferring positive emotion through a wearable tangible interaction design initiates new public interaction possibilities for prosocial connection and bonding.

Keywords

Wearable technology, laughter, responsive wearable tech, psychophysiological mirroring, social mimicry, emotion contagion, prosocial behavior.

Introduction

A recognized repercussive trend from the integration of personal mobile telecommunication technologies within our daily lives is the shift away from face-to-face communication. This results in the loss of physical, social intimacy between collocated persons and may lead to lost opportunities for positive bonding towards meaningful connections. Project and research initiatives [5, 6, 13] emerge to explore new social devices to invigorate prosocial interaction within a shared environment. In particular, the use of wearables [1, 8, 9] has been proposed for its potential to afford multimodal intuitive and intimate cues towards tangible social bonding. In exploration for cues as initial catalysts to encourage observers for prosocial behaviour, research on laughter highlights that auditory, facial, and movement expressions of laughter are contagious and can elicit a mirroring of similar psychophysiological and emotional reactions within an observer. Our exploratory wearable design, Laughing Dress [Figure 1], presents prospects of augmenting these psychophysiological feedbacks into sound and rhythmic light expressions to promote opportunities for social interactions.

Figure 1. Laughing Dress. © SFU SIAT MovingStories
- Soma Embodied Wearable Group 2015

Why Laughter?

Laughing plays a key role in human social interaction and is a natural form of vocal and kinetic expression to communicate a joyous mood. Laughter contains a rich palette of acoustic characteristics that encompass qualities to evoke positive feelings in the observer, which can lead to cooperative behaviour, mutual trust, and social bonding. The organic signals of laughter can provide insight towards how behaviour is used as a corporeal control of physical and social relationship between the wearer and spectators within a collocated communicative space.

Auditory Expression: Joyous Mood of Social Togetherness
Laughing sounds can stimulate a sense of warmth and connectedness to foster social comfort and trust between persons [10]. In literature, Duchenne smiles and laughter can signify as friendliness and playfulness, which helps to bring collocated observers closer together [4, 10]. Within interactive systems, studies underline the use of synthesized laughter to evoke and prolong laughter and smiles within study participants [3, 12]. Laughter and smiles are social behaviours that can express and transform the affective states from the initiator to the perceiver. The act of laughing is categorized as voiced and unvoiced, where the acoustic variability from the rate of laughter demonstrates a range of high to low intensity expressiveness. Within our wearable design, we map the volume of the projected laughter to the physical distance between the wearer and

the collocated perceiver. As physical distance correlates to the social distance between two persons [2], a shorter physical distance will increase the amplification of the laughing sounds; an intensified projection of laughs signifies a greater generation of positive mood and a closer connection between the two subjects. This interaction is implemented through an ultrasonic distance sensor that is located at the collarbone region. Proximity data between the wearer and co-located spectators are mapped to the projection of sound through a small speaker on the left shoulder. Deriving the ludic element of laughter, we integrated the corporeal control of proximity within our interaction design to elicit curiosity and opportunities for playful interaction and discussion between the wearer and collocated perceiver.

Visual Representation and Body Movement: Signifier of Positive Emotional Reaction
While the magnitude and direction of laughter as contagion is primarily auditory based [10], it is noted that the act of laughing involves the entire body; the elicited feedback between the wearer and collocated observers can be kinetically articulated as facial expressions, posture, and body movements [7, 14]. In a laughing state, the torso often arches backwards while shaking [11]. This physiological state interlinks with the human breath, where the body engages with rapid contractions of the intercostal muscles and results in a rhythmic laughter-respiratory pattern. In the study of laughter, there is little focus on the dynamic changes within a person's posture and body movements. Through our design process, we highlight these physical mechanisms as visual expressions on our wearable interface to complement the radiation of acoustic energy. The kinetic characteristics of laughter are translated into light pattern expressions and are mapped to the wearer's torso movement. As movements from breathing associate with the intensity of laughter, the elevation in activity at the body's upper torso region infers to the increased induction of positive emotion. The interaction is implemented by detection of the wearer's upper torso XYZ movement data through a tri-axis accelerometer. The changes in motion data are then mapped to light pattern output along 4 vertical series of LED Pixels at the lower torso region of the garment. By providing a visualization of positive affective state emitted, we engage observers to smile, laugh, and make eye contact as means to initiate positive social bonding with the wearer.

Conclusion and Future Work

We have presented the potentials to leverage laughter through audio-visual expressions within a wearable responsive design to initiate and enrich collocated prosocial interaction. Laughing Dress provides an interactive experience for the wearer and collocated observers through a repurposing application of laughter for reflecting upon self-presence, interpersonal behaviour, and the physical environment. The reveal and use of our body states not only promote a new perspective of our inner-self, but also transcend the archetypal social norms to create positive connections with others within a public space.

As we move forward, we are interested to explore the potential of utilizing laughter as a contagion for positive emotional transference and social reconnection from the lab environment to everyday scenarios. We hope to find patterns of behavioural responses that will inform future iterations of audio-visual cues to be unobtrusive and intuitive on the wearable body.

References

1. Abouzied, A., Chen, J. 2014. CommonTies: a context-aware nudge towards social interaction. In Proceedings of the companion publication of the 17th ACM conference on Computer supported cooperative work & social computing (CSCW Companion '14). ACM, New York, NY, USA, 1-4.
2. Biel, L. 2010. Proxemic Motivation in Language: Relational Metaphors And Registers. In Stanulewicz, D., Wolański, T.Z., Redzimska, J. eds. *Lingua TerraCognita II. A Festschrift for Professor Roman Kalisz*, Gdańsk: Wydawnictwo Uniwersytetu Gdańskiego, 183-203
3. Fukushima, S., Hashimoto, Y., Nozawa, T., Kajimoto, H. 2010. Laugh Enhancer using Laugh Track Synchronized with the User's Laugh Motion. In Work In Progress CHI 2010, ACM Press(2010), 3613-3618.
4. Harker, L., Keltner, D. 2001. Expressions of Positive Emotion in Women's College Yearbook Pictures, and Their Relationship to Personality and Life Outcomes Across Adulthood. *Journal of Personality and Social Spcyhology* 80 (1): 112-124.
5. Jarusriboonchai, P., Olsson, T., Väänänen-Vainio-Mattila, K. 2013. Roles, scenarios and challenges of social devices. In Proceedings of the 2013 ACM conference on Pervasive and ubiquitous computing adjunct publication (UbiComp '13 Adjunct). ACM, New York, NY, USA, 1575-1578. 4.
6. Le, D., Funk, M., Hu, J. 2013. Blobulous: Computers As Social Actors. In CHI' 2013 Workshop on Experiencing Interactivity in Public Spaces (EIPS), April 2013.
7. Neuman, R., and Strack, F. 2000. "Mood Contagion": The Automatic Transfer of Mood Between Persons. *Journal of Personality and Social Psychology* 79(2): 211-223.
8. Olsson, T., Jarusriboonchai, P., Väänänen-Vainio-Mattila, K. 2015. *Towards Wearable Displays Aiming to Enhance Social Interaction.* CHI'15 workshop on Mobile Collocated Interactions. April 2015.
9. Prabhu, V., Olsson, T, Väänänen-Vainio-Mattila, K. and Jarusriboonchai, P. How Can Wearables Support Co-Located Social Interaction? Workshhop on Interactions and Applications for See-Through Technologies, in NordiCHI'14 conference, Helsinki, October 26th, 2014.
10. Provine, Robert R. (1992). Contagious laughter: Laughter is a sufficient stimulus for laughs and smiles. Bulletin of the Psychonomic Society, 30, 1-4
11. Ruch, W. and Ekman, P. 2001. The Expressive Pattern of Laughter. In Kasznaiak, A.W.,eds. *Emotion Qualia, and Conciousness.* Tokyo, Word Scientific Publisher. 426-443.
12. Shahid,S. , Krahmer, E., Swerts, M., Melder, W., and Neerincx, M. 2009. Exploring social and temporal dimensions of emotion induction using an adaptive affective mirror. In CHI '09 Extended Abstracts on Human Factors in Computing Systems (CHI EA '09). ACM, New York, NY, USA, 3727-3732.
13. Teevan, J., Morris, M.R., and Saponas, T.S. Mobile Support for Face-to-Face Social Interaction. 2014 Human-Computer Interaction Consortium Workshop (HCIC), June 2014
14. Van Baaren, R.B., Holland, R.W., Kawakami, K., and Van Knippenberg, 2004. A. Mimicry and Prosocial Behaviour. *Psychological Science* 15(1): 71-74.