How Culture Shapes the Brain
Implications for Neural Mechanisms Underlying PTSD in Refugees

BELINDA LIDDELL
STARTTS CLINICAL EVENING - 2 AUGUST 2017
EMAIL: B.LIDDELL@UNSW.EDU.AU
Overview

1. What is culture?
2. Cultural variations in self-representation or ‘self-construal’
3. Cultural neuroscience evidence for how self-representation shapes the brain
4. Inferences for understanding of the neural substrates of PTSD
5. Implications for refugee mental health
Defining culture....

- Framework for understanding the self in the world
  - Information system shared by a group, facilitating survival and deriving meaning from life (Kitayama & Juang, 2013)

- Reinforced practices of cultural groups impact on the psychology of the individual (Kitayama & Uskul, 2011).

- Results in a diversity in ways of thinking about, behaving and engaging in the world (Henrich et al., 2010).

- Cultures differ substantially in the conceptualization of the self (Markus & Kitayama, 2010).
Hofstede’s cultural/societal dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Collectivistic</th>
<th>Individualistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>INDIVIDUALISM - COLLECTIVISM</td>
<td>Social integration / egalitarian</td>
<td>Individualistic</td>
</tr>
<tr>
<td>POWER DISTANCE</td>
<td>Ambiguity is comfortable</td>
<td>Hierarchical</td>
</tr>
<tr>
<td>UNCERTAINTY AVOIDANCE</td>
<td>Social integration / egalitarian</td>
<td>Individualistic</td>
</tr>
<tr>
<td>MASCULINITY – FEMININITY</td>
<td>Ambiguity creates anxiety</td>
<td>Power important</td>
</tr>
<tr>
<td>GOAL ORIENTATION</td>
<td>Power important</td>
<td>Power important</td>
</tr>
<tr>
<td>RERAINT – INDULGENCE</td>
<td>Short-term goals prioritized</td>
<td>Short-term goals prioritized</td>
</tr>
<tr>
<td>Happiness is always good, hedonism</td>
<td>Happiness is always good, hedonism</td>
<td>Happiness is always good, hedonism</td>
</tr>
</tbody>
</table>

Adapted from: https://www.linkedin.com/pulse/hofstedes-dimensions-culture-tool-global-marketing-jeffrey-foster
Cultural dimension of self-representation

**Individualistic - independence**

- Independence
- Unique self
- Values autonomy
- Personal achievement
- Analytical thinking
- Western-based cultures
Cultural dimension of self-representation

- Interdependent
- Relatedness & connection
- Social harmony
- Holistic thinking
- East Asian and other non-Western cultures
Cultural dimension of self-representation

Individualistic - independence  Collectivistic - interdependence
Collectivism – Individualism World map

n.b. White: no data
Relevance to psychological science?

The weirdest people in the world?

W – Western
E – Educated
I – Industrialized
R – Rich
D - Democratic

Joseph Henrich
Department of Psychology and Department of Economics, University of British Columbia, Vancouver V6T 1Z4, Canada
joseph.henrich@gmail.com
http://www.psych.ubc.ca/~henrich/home.html

Steven J. Heine
Department of Psychology, University of British Columbia, Vancouver V6T 1Z4, Canada
heine@psych.ubc.ca

Ara Norenzayan
Department of Psychology, University of British Columbia, Vancouver V6T 1Z4, Canada
ara@psych.ubc.ca
Cultural neuroscience models

Note. Each factor in the cultural neuroscience model may be composed of a set of variables of each type (e.g., A1, A2 refers to distinct environmental variables; B1, B2 refers to distinct cultural variables).

FIGURE 1—Cultural neuroscience model of human behavior.

Kitayama & Uskul (2011); Oyserman (2014); Figure from adapted from: Chiao J & Blizinsky K (2013). Population Disparities in Mental Health: Insights From Cultural Neuroscience, American J Public Health, 103, S122-S132; Usk
What Cultural Neuroscience is telling us

- Culture shapes the brain (Han et al., 2013; Han & Northoff, 2008)
  - Cultures differing in predominant self-representation show markedly different patterns in psychological responses, behaviours, *brain function and gene expression*.

- Self-representation provides a “cultural framework” for investigating the brain

- Studies have predominantly focused on comparing specific cultural groups: Western/Caucasian (American) vs East Asian
  - Few studies examine non-East Asian collectivistic cultural groups

- Studies have begun to test individual differences in self-construal as a key moderator of brain function – both within cultural group and regardless of cultural grouping
Cultural differences in self-representation

Attentional biases

Cultural differences in self-representation

Cultural influences on attention

Cultural influences on emotion attention

Western European group (n=42)

East Asian group (n=40)

Liddell B & Falon S (In Preparation): The impact of culture on the encoding & consolidation of complex emotional stimuli.
Self-representation influences of emotion

- Self-representation priming had no effect on attention or subsequent memory
- Trait individualism predicted greater eye gaze towards centralized threat
- Trait collectivism predicted greater recall of peripheral neutral information
Attentional biases

Cultural differences in self-representation

Emotion processing & regulation

Cultural differences in face perception


Self-representation modulates emotion neurocircuitry

- Collectivists engage stronger context-dependent activity to negative cues – insula and occipital cortex

- Individualists show greater face sensitivity – middle cingulate gyrus

- Collectivists activate the parahippocampal gyrus to negative faces and individualists activate prefrontal cortex and temporal pole to negative contexts

- Suggest compensatory neural activations when key reference information is missing (as seen in Hedden et al., 2008; Liddell et al., 2015; Han & Ma, 2014)

Liddell B et al. (2017) Self-construal differences in neural responses to negative social cues, Biological Psychology, in press
Cultural differences in emotion expression and regulation

- Culture shapes emotion regulation strategy preferences and the adaptiveness of that regulation (Ford & Mauss, 2015)
  - Collectivistic groups habitually engage in emotional suppression - which does not afford the same negative consequences observed in individualistic cultural groups (Butler et al., 2007)
  - May even have beneficial consequences if consistent with cultural context (e.g. Le & Impett, 2013)

- Collectivists prefer low-arousal positive states (e.g. calm) vs individualists who prefer high-arousal positive states (e.g. excitement) (Tsai et al., 2009)
Cultural differences in memory

<table>
<thead>
<tr>
<th>Individualists</th>
<th>Collectivists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-focused</td>
<td>Group-focused &amp; social interactions</td>
</tr>
<tr>
<td>Specific</td>
<td>General</td>
</tr>
<tr>
<td>Personal events</td>
<td>Involving significant others</td>
</tr>
</tbody>
</table>

Jobson et al., 2014; Ross & Wang, 2010

- Trauma memories: The more culturally appropriate remembering (e.g. self-focused vs other-focused), the less intrusions reported (Jobson & Dalgleish, 2014)

- Comparing Australian, British and Iranian trauma survivors with PTSD found no difference in the quality of autobiographical memories (Jobson et al., 2014)
Cultural differences in self-referential processing

- Medial prefrontal cortex – critical to self-referential processing
  - Stronger activity in collectivists during contextual self-referential processing but for individualists during general self-referential processing (Chiao et al., 2009)
  - Stronger activity for collectivists when making judgements about themselves in relation to their mothers, but for individualists when making self-only judgements (Zhu et al., 2007)

- Social pain area activations (i.e. dorsal anterior cingulate cortex) stronger in collectivistic vs individualistic groups when perceiving others in emotional distress (Cheon et al., 2013)

Attentional biases

Attachment, & social support

Self-referential processing

Autobiographical memory

Emotion processing & regulation

Cultural differences in self-representation

Cultural differences in attachment

- Benefit of social support differs across cultural groups (Taylor et al., 2007)
  - **Explicit** social support was beneficial for *individualist* participants (decreased subjective stress and decreased stress hormone release)
  - **Implicit** social support was more beneficial for *collectivist* participants
  - Support converse to cultural preference increased stress
Attentional biases

- Attentional bias to threat, attentional narrowing
- Cultural differences in self-representation
  - Disturbances to self-referential and identity; altered default mode network functioning
  - Self-referential processing
  - Autobiographical memory
  - Emotion processing & regulation
  - Attachment & social support
  - Altered fear neurocircuitry and poor emotion regulation; altered context processing

Socio-interpersonal model of PTSD

‘Threat to the conceptual self’ model

Integration: Conceptual model

Implications for refugees and torture survivors

- Many refugees are from collectivistic societies and hold strong collectivistic self-representations; could affect how the brain is shaped by refugee traumatic experiences.

- **Nature of torture trauma**: torture aims to breakdown interpersonal connections and attachments
  - For those who are highly collectivistic and draw on interpersonal relationships to define the self, the aftermath of torture may be particularly devastating.
  - Could impede post-trauma recovery pathways

- **Post-migration stressors**: Acculturation, shifts in cultural expectations and role in families, inter-generational conflict
Summary

- Variations in individualistic-collectivistic self-representation changes how the brain functions in five core domains.
- These same domains are known to be disrupted in PTSD.
- Implications for understanding the neural basis of PTSD and trauma in refugees who often come from collectivistic societies.
- A very limited evidence-base that will need to be developed via testing and data gathering.
Acknowledgements

- Vera Newman
- Samantha Falon
- Bronte Courtney
- Emma Williams
- Richard Bryant
- Steve Most
- Tom Beesley
- Angela Nickerson
- Emma Doolan
- Jonathan Soloman
- Gin Malhi
- Kim Felmingham
- Tom Whitford
- Pritha Das
- Eva Battaglini
- Team in the Bryant Lab and Refugee Trauma and Recovery Program, UNSW Sydney
How Culture Shapes the Brain
Implications for Neural Mechanisms Underlying PTSD in Refugees

BELINDA LIDDELL
STARTTS CLINICAL EVENING - 2 AUGUST 2017
EMAIL: B.LIDDELL@UNSW.EDU.AU