UNDERSTANDING CLIMATE CHANGE REPRESENTATIONS OF ENVIRONMENTAL SCIENCE STUDENTS: A SOCIO-PSYCHOLOGICAL APPROACH

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Abstract: Social Representation Theory was applied to understand how environmental science students of JNU, University of Delhi and Indian Institute of Technology (Delhi) represented climate change. The responses were acquired through open ended questions in one on one semi structured interview format. It was found that respondents' dominant representations reflected those that were already part of social discourse and respondents claimed to have had perceptual experience of climate change Also a mild undercurrent of skepticism was evident from the responses. Implications for science communication are discussed at the end.

Keywords: Climate Change, Climate Change Experience, Skepticism, Social Representation Theory

I. INTRODUCTION

In the last few years, the issue of climate change has become a crucial issue from developmental, environmental and ethical perspectives. A vast majority of Indians still subsist on less than US $2 a day (Ghosh, 2009). Therefore, economic development is an important policy goal. However it should be achieved in an environmentally sustainable manner. The current trajectory of economic development relies heavily on fossil fuels and thus would contribute to climate change. Moreover, climate change itself would lead to erratic rainfall patterns, change in disease profile and temperature rise which in turn can bring growth down (Saxena, 2009; Bhattacharya et. al., 2006)**.** Effective policies to deal with climate change are the need of the hour but acceptance of these policies by the public depends on public understanding of climate change. It is in this context that people's representations of this issue gain importance and deserve to be studied.

II. METHOD

The sample consisted of 67 environmental science students from three well known universities of Delhi – Jawaharlal Nehru University, University of Delhi and Indian Institute of Technology (Delhi). The interviews were conducted between February and September, 2015. The interviews were not structured. Students were asked to elaborate their views on what they understood by climate change. Supplementary questions were asked whenever required. The interview was recorded electronically and transcripts were analyzed qualitatively using thematic analysis.

III. LITERATURE REVIEW

Social representations can be seen as cognitive structures which facilitate understanding and communication between members of a group by embedding novel experiences in a familiar context. This is achieved by the two processes of 'Anchoring' and 'Objectification'. The first process sets new, strange and unfamiliar categories in a familiar and known milieu. The second process translates an abstract concept into a concrete entity (Breakwell, 1993). This essentially involves explaining a mental construct by reference to physical reality, thereby transforming a 'purely intellectual' and 'remote' category into something 'physical' and 'accessible' (Moscovici, 2000). SRT can enable us to know how knowledge about a phenomenon such as climate change gets transformed when it passes through the media and to the public. Joffe (2003) points out mass media change the reified, scientific universe into lay thinking. Social representation is a tool to explore the transformation of science when it is diffused in the public domain and to examine the common sense that arises in its wake.

Many times, especially in a developed country like US, climate change and its effects are perceived to be distant, both in space and time. Climate change is seen to effect the population of developing nations more than their own. (Lowe et. al., 2006). It becomes difficult for people to project themselves 20 years into future to consider the effects of climate change. It can become a substantial obstacle in establishing a dialogue between public and issue of climate change (Lorenzoni and Hulme, 2009). This may influence people's response to the problem. Thus in American perception of climate change, more concern is shown for its effects on ecology and animals rather than human health, disease pattern and morbidity**.** Personal experience of effects of climate change also influences people response towards the issue. Effects of climate change are generally long term and are hard to detect in the present. In this context, personal experiences could be misleading or alternatively, may mean that a small section of people are able to tap direct experiences of global warming (Akerlof et. al.,

2013). The notion of climate change is associated with other popular scientific concepts that are already somewhat better understood by the public. Thus, many studies from early 1990s to early found that climate change was linked to environmental pollution, deforestation, melting glaciers, rising temperature, adverse impacts on animals and plants, chlorofluorocarbons and ozone depletion.

Strictly speaking, only weather and not climate can be a part of personal experience. Climate is a long term average of weather phenomenon, normally on the scale of 40 – 50 years. However, weather provides an easy and accessible frame of reference to understand climate change. This 'domestication of knowledge' allows a layperson to form an opinion on climate change Most of those who claim to experience effects of climate change use descriptions like warmer winters, change in snowfall pattern, change in precipitation and so on. These experiences may or may not corroborate with scientific evidence (Akerlof, 2013). These personal experiences may lead to heightened concern and action with respect to climate change. But it may also introduce a systematic bias in the understanding of climate change. Events recalled from memory can easily mislead. The occurrence of extreme weather events and high outdoor temperature share a complex relationship with one's perception on climate change. Joireman et. al. (2010) found that the relationship was positive in general, but when outdoor temperatures were high, the relationship was non-existent. Similarly, Lo and Jim (2014) observed that even though abrupt precipitation is considered ones of the effects of climate change but people of Hong Kong don't associate it with climate change as they are used to heavy precipitation. French heat wave of 2003 changed the perception of people about climate change forever. Heat wave was taken to be the present manifestation of climate change (Poumadere, 2003).

There has been a steady increase in US in the number of people who think of climate change as a 'hoax' and also those who think that the issue of climate change is blown out of proportion (Whitmarsh, 2011). This is not a direct reflection on the issue per se but the way it is communicated. However if unchecked, this can develop into a hard core skepticism overtime. It is observed that people with strong skepticism or 'deep skepticism' towards climate change are unlikely to engage in any public discussions on the issue. Even when confronted with solid counter evidence, they still remain ambiguous and continue to deny the reality of climate change. The same trend of rising scepticism was observed by Poortinga et. al. (2011) in UK. There was a considerable rise in skeptics and especially those who thought climate change was because of natural causes. Even when climate change is considered to be real and threatening, people can still adopt a casual attitude towards behavioural obligations. This can result in voting for candidates who are considered as not being concerned about environment or it may be that threat is perceived to be real but relatively unimportant compared to other pressing issues.

IV. FINDINGS

As shown by other studies, in this study too the respondents representations of climate change mostly centred around their observations of their environment. Temperature, rainfall, seasonal variations and pollution were the most frequently used categories. Roughly 90% of the respondents understood climate change with reference to one of the above categories. Consider the following excerpts:

"....*look at the temperature, it is around 44 degrees.....earlier at this time it never used to be this high"* (M.T, DU)

"....*earlier in the summer the temperatures used to hover around 38 – 39 but now you see it goes up to 45.....this is the result of climate change.....another thing is if you see the monsoon or precipitation pattern has become abrupt.....rainfall isn't proper....."(*K, DU)

".....*have seen changes in agriculture in my village in Bhiwani because of climate change.....now rains come late at the time of harvest..."(*K. S., DU).

Many respondents recalled their childhood or teenage days and compared the difference.

*"...if we go back 10 – 15 years when we used to go to school the winter would start around October....but now in October we are all wearing summer clothes....you can actually feel the shift..".(*U. S., DU)

".....*at this time it didn't use to rain...now it is raining...its not raining in winters but now.....even in my area (Hisar, Haryana) the sowing of wheat has been affected because of shifting rainfall patterns..."(*N. M., DU)

Although unlike most lay people, they are aware that climate change is long term and thus difficult to detect, yet most of the students associate it with relatively short term fluctuations. They seem to be harbouring contradictory beliefs here, what is called by Social Representation Theorists as 'Cognitive Polyphasia'. However, even at the cost of this inconsistency, direct perceptual experience enabled 'objectification' of abstract concept of climate change. This made association of people with climate change issue easier.

The most unexpected finding of our study was the presence of scepticism. About 15 out of 67 students expressed some form of scepticism regarding the anthropogenicity of climate change.

"*I can't construct my opinion based on the journals provided by western countries.....would like to see a non partisan view".(*An, DU)

I think that there is no doubt that anthropogenic activity is effecting but how much.....90 – 95%!.....can

*we rely on that.....i think there is a question mark...."(*A. K., JNU)

".....*are you sure it is anthropogenic?.....are you talking about just CO2 or other things like black carbon too.....CO2 can increase because of volcanic eruptions too....black carbon has been increasing.. it warms the atmosphere but cools the surface.....so you can't generalize"* (S. C., IITD).

The skepticism in the west was at least in part attributed to media. The journalistic norm of giving equal space to both the groups in the early half of 2000's hid the large scientific consensus and made climate change more controversial to public than it was (Boykoff and Boykoff, 2007). In contrast, Indian media has mostly used the risk-responsibility frame for climate change. Rather than highlighting the epistemological uncertainty or the controversy aspect of climate change, Indian media focussed on the risks climate change poses to India and developed countries' obligation to help India financially and technologically (Billett, 2009). The politics in the west, especially in US, has clear faultlines on the issue of climate change. The sceptics are more likely to endorse conservative political views and support Republican Party (US) (Poortinga et. al., 2011). However, there are no such demarcations in the politics of India. The issue of climate change or environment is virtually non-existent from the political discourse in India. The political divisions are mostly observed along caste or religious lines. Thus neither media nor politics can be a significant source of doubting climate change. Another source of skepticism could be exposure to sceptical views of scientists in online blogs, journal articles and so on. However, during interviews none of the respondents claimed to have done any systematic reading of sceptical literature. The presence of skeptcism in Indian public should be further researched.

CONCLUSION

Unlike public in the western countries, Indians don't see climate change as a distant issue. For them climate change is manifested in day to day abnormal weather conditions. Perceptual experience played a big part in construction of climate change representations. Their representations coincided with those that are already dominant part of social discourse in India. Thus, as Social Representation theory argues, it was found that representations were constructed through social dialogue. An aspect that requires further research is the presence of skepticism. As pointed out above, it cannot be ascribed to usual factors that are suggested by current literature. Finally, the discursive frames used by people are important for communicating science effectively. Since temperature, rainfall and pollution were the most common representation, it would be prudent for science communicators to use these frames while communicating climate change. This will ensure maximum positive effect of the message.

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