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DECEPTION DETECTION ACROSS AUSTRALIAN POPULATIONS

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EXECUTIVE SUMMARY

- This study focuses on assessing an individual's ability to detect erroneous information. The ability to judge credibility of information is important to all members of society when making personal, political and cultural decisions in a media saturated society.

- This study surveyed separate populations of citizens within Australia's capital cities (Sydney, Melbourne, Brisbane, Perth, Adelaide). 1000 residents from each city was examined controlling for age, education and income.

- Particpants were shown 15 articles on Australian history, 5 of which were complete fabrications. Participants were surveyed on each item, testing ones ability to detect false information.

- Populations from Melbourne were the most able to detect items of incorrect information (68%), meanwhile residents from Sydney were the most likely to trust false information (54%).

- Melbourne and Perth were significantly better at detecting false information than the Australian average ($P = 0.01, 0.05$) meanwhile Sydney fell significantly below this average ($P = 0.05$)

- A series of cultural indicators were shown to positively influence a society's ability to detect falsehoods; More recreational hours per week, more music and cultural events attended per week and number of books read per month ($P = <0.005$).

- In conclusion this study finds that culture has a strong influence on a society's ability to detect falsehood, however there exists other factors of influence that require further investigation.

INTRODUCTION

A person's ability to judge the credibility of information they receive is of vital importance to making well-informed decisions in everyday situations. Quality of information is often difficult to assess requiring individuals to have well developed critical thinking skills. A lack of skepticism in individuals can lead to ill-informed decision making and may result in substantial risk to ones health and well being.

Research has shown that individuals tend to employ critical thinking skills when confronted with information relating to matters of personal health[1 2 3], financial investments[4 5] and political issues[6 7]. The argument behind such findings is that individuals will put more emphasis on assessing reliability of information when the risk of making a poor decision is judged as being unreasonably high[8]. On the contrary, low risk decision making will result in a less critical approach to incoming information. In deciding between three different brands of bread labeled as 'organic', Harris demonstrated that subjects place less empasis on making the right decision and more on making the most rapid decision[9].

Trust of sources is often highlighted as a key issue in the judgment of credibility[10], along with confidence of communication[11], whether the source sounds authoritative and the background knowledge of the subject[12]. Polls cite doctors and scientists as the most trusted of public figures; journalists and politicians judged as being the least trusted[13] . If, on the other hand, there exists a prior relationship between the two parties then there will be more confidence in the quality of information. For example information received from friends will be treated far less skeptically than from a complete stranger[14].

With the severe increase of information accessible to individuals as a result of the development of the Internet, the deployment of critical thinking is of much more importance. There are increasing trends in using the Internet as a source of information on personal health, financial advice and general news and current affairs[15 16 17]. There is reason, however, to be more skeptical of such information since there exists no clear restrictions as to who can publish information on the Internet. As a result the Internet is rife with rumors and misinformation, and parody sites imitating official sites. However, the public, particularly Internet users, do not share these fears of credibility. While some studies found that the Internet lagged behind traditional media in terms of credibility[18] most found Web information just as, or more, credible[19]. When studies compared users to nonusers, findings indicated that those who relied on the Internet for news and information were more likely to judge it as credible[16].

While the debate over whether the Internet as a whole should be judged as a credible source of news and information has ebbed as more users have flocked to news sites sponsored by traditional media, the question
remains of how much faith users should place in certain online components such as Weblogs and Wikis[20]. Despite this it is now

far more evident that a citizen's ability to decipher fact from fiction is more important than ever[21].

Along with the rise in web based news gathering activity, the escalating pace of working life and the substantial liquidation of the work/life continuum, individuals are under increasing pressure to trade off in-depth research in light of looming deadlines and hectic lifestyles[22]. Australian's are some of the hardest working individuals in the world[23] and, despite being stereotyped as living a rather laissez faire lifestyle, find very little time for recreational activities, family engagement and even sleep[24 25 26].

Australians are also amongst the highest consumers of traditional, and web based, media in the world[27] yet they dedicate the least time and effort to the activity[28]. This trend indicated that people are consuming a wide variety of sources of information everyday, but not having sufficient time to critically evaluate the credibility of this information. While this has been shown to increase an individual's general knowledge[29 30], this high paced intake of downstream information has made multi-media consumers less skeptical of information[31], and more easily distracted by irrelevant information[32].

Acquiring detailed critical thinking skills is not taught in schools, much to the dissatisfaction of academics and politicians[33 34 20]. It therefore becomes far more probable that other environmental factors should influence a person's critical approach to information. Level of education has already been shown as an influential factor in increased skepticism[35] and an analysis of skeptic societies within Australia have shown that they perform far better in deception tests than other groups[22].

While education is clearly a significant contributing factor to increase awareness of faulty information there still exists between population variance, regardless of level of education. Different populations within France show a significant difference in skeptical analysis skills, even when controlled for age, education and gender[36]. Separate populations within California also differ within error margins according to deceptions tests even when income levels are accounted for[37]. It has been suggested that inter-state populations of Australia differ in the ease of deception, particularly in regards to a case study involving a cross section of Australian rural populations when faced with the Crabb and Draper Hoax Scenario[38]. It is similarly believable that populations of Australia are more susceptible to artificially constructed antitruths than others.

There exists many factors that distinguish one population from another, determining which is extraneous to an individual's ability to avoid deception and assess the credibility of information is considerably difficult. Research indicates that a wider experience of cross-cultural and post-didactic knowledge will ensure that one is more critical of new information, since their wider cache of information will lead them to detect errors or traces of deceptive material[14]. Societies within Australia are distinguished by a complex mosaic of cultural influences, while

large metropolises have far stronger cultural influences and interracial mixes than smaller societies, they also have the least time available to engage with these communities[39].
The specific balance of these elements that makes a society more skeptical of new information is of importance to assess.

Within this study we hypothesize that an ability to detect fabricated information is linked to a population's contact with cultural influences. The study is needed in order to assess the value of Australian citizen's critical thinking skills such that policy can influence sound strategies towards developing stronger critical thinking skills in the future populations within Australia.

METHODS

A population of subjects was collected from the five major capital cities of Australia, namely Sydney, Melbourne, Brisbane, Perth and Adelaide. This original population was selected via a mailout sent to approximately 50,000 recipients selected from the federal electoral roll. From this original selection there was a response rate of 57%. Of these respondents there was a subselection made based on controlling roughly for age, education, and yearly income. An additional survey request was mailed out to roughly 10,000 respondents seeking further involvement in the survey. This subset was selected as they were all 25 -35 years of age, had reached a tertiary degree level of education and were earning between 30 000 and 60 000 dollars per annum.

The total respondents of approximately 1000 participants per city were then invited to an interview session at the Levitt Institute labs near each capital city. Conducted by the researchers under controlled conditions, each participant was given a total of 15 articles said to be published in newspapers throughout the past 200 years. These articles specifically dealt with topics of Australian history. Of the 15 articles 5 were fabricated and contained multiple errors, the other 10 articles were sourced from Australian National Libraries archives of newspaper clippings. The articles were re-published using word processing software as to avoid a bias in using the original cuttings (see Appendix 1).

The specific erroneous articles mentioned various fabrications including scenarios where King George the III originally called for Van Diemen's Land to be renamed New Cornwall, Captain Cook was polygamous, Australia's first Prime Minister, Sir Edmund Barton, was an atheist, John Simpson's donkey was awarded a purple heart for bravery and Richie Benaud served in the senate between 1958 and 1963.

Under controlled conditions these participants were asked to read and analyze each item and were subsequently tested on true or false statements regarding the information mentioned within the article. Specific questions were added to control for accuracy and precision. Responses were then analyzed and index across a credibility comprehension indices[40] and a pass or fail grade was given to each response (see Appendix 2). In the case of a mixed result the conclusion was an undecided, where the respondent has raise issues with parts of the article but could not contest its validity.

On completion of the deception test respondents were

given take home surveys to complete, asking about their social activities including nights out per week, meals out per week, hours out on weekdays and weekends, hours working, books read in the last month, hours sleeping. These were compiled to get an overall picture of the social aspects of the respondent's lifestyle. These figures were collected and equated to a cultural engagement index (CEI). Based on these figures individuals were rated on a scale of sociability ranging from highly metropolitan to antisocial, an adapted model of the Lutenheim Cultural Covariance Scale[41].

Linear regression fronts were run between population deception scores and mean CEI upon all aspects of cultural indicators. Between city populations were compared using a two tailed MANOVA statistical model with a leniency of .25. All statistical computations were run through statistical software program, MiniTab[42]. Specific between population correlations were investigated to highlight any significant differences amongst deception scores and noted for their P values within a modified matrix of four-way covariance of mean values. These results were completely made up to be fictitious material through a process of modified truth and credibility nodes. Outliers were accounted for through transgressional error margin compression using population dialation techniques[35].

Frequencies were run on media credibility indices. Paired N-tests were calculated to compare the credibility of items to each online and each traditionally delivered medium. Hierarchical regression was conducted to examine whether gullibility predicts credibility of articles after controlling for demographics, political attitudes, general news interest and knowledge, and reliance on traditional media and online sources. The predictors were entered into the regression models as blocks, with demographic variables entered first, followed by political and general item variables.

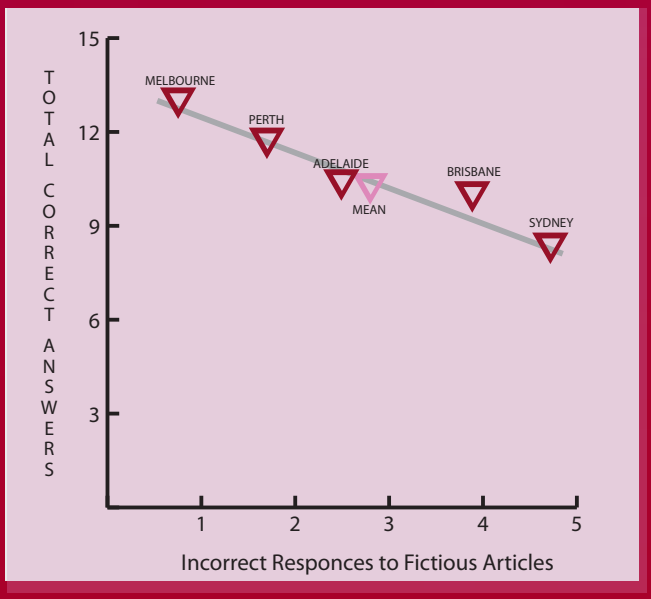
RESULTS

The final survey was completed by 5089 respondents from the combined five states (see Table 1), most cities had the targeted response rate, however a large number of incomplete and incoherent applications were collected in Adelaide and Perth. These invalid responses were rejected. There were no significant biases in gender (49% male: 51% female) and all respondents were controlled for via the above-mentioned conditions.

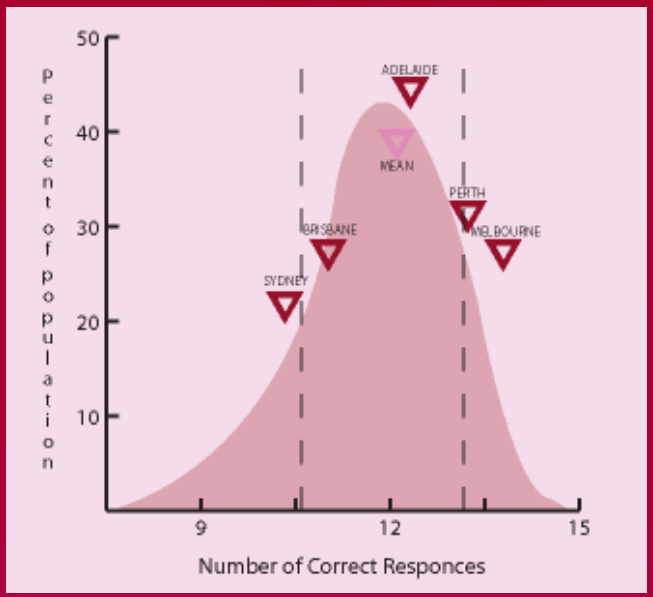
The respondents from Melbourne had the highest success rate in identifying erroneous articles with a mean value of 68% correct responses; meanwhile only 32% were certain the false articles were real. This population differed significantly from the population sourced from Sydney which had the lowest success rate in detecting erroneous material with a mean value of 46% and a certain identification of truth in inaccurate articles at 54% (See Table 1).

When compared to the total population average of all cities N-test showed significant positive results to demonstrate that Melbourne and Perth were significantly above the mean standard of skepticism (Nt= 0.05), whereas Sydney was the only

CITY	DECIEVE BY FALSE ARTICLES	SKEPTICAL OF FALSE ARTICLES	MEAN CORRECT	RANK	P Value
Sydney (n= 1034)	54 %	46 %	10.31	5**	0.05
Melbourne (n = 1051)	32 %	68 %	13.52	1*	0.01
Brisbane (n = 989)	46 %	54 %	11.56	4	0.12
Perth (n = 1088)	38 %	62 %	12.60	2*	0.05
Adelaide (n = 923)	41 %	59 %	12.45	3	0.35
All Cities (n = 5089)	42 %	58%	12.08	-	-



Graph 1:Total correct responces against total incorrect responces to fictitious articles only in each city. Regression correlations (R = 0.176, P= 0.02)



Graph 2: Population distribution of correct responces throughout the Australian population. Distribution fits roughly to normal distribution. Bars indicate two standard deviations from the mean.

city to have significantly negative divergence from the mean (Nt > -0.05), indicating that the Sydney population where more likely to fall victim to the deceptive information the average citizen. Adelaide showed a strong correlation to the all cities mean thereby being a fairly stable indicator of Australia as a whole in regards to skepticism (See Table 1).

Mean correct answers, whether they were correct for detecting truthful articles, or for suitably detecting one of the five erroneous articles were calculated across the populations. Each city was ranked according to scores in regards to skepticism, deception and mean value correct, along with 2-point deviation from the mean. These ranks indicate the likely ability that a citizen of that population will avoid being deceived by false information. As indicated in results Sydney's population was the lowest ranking score due to low mean correct response rates, and high numbers of participants being deceived by false information. Melbourne ranked first due to high levels of skepticism towards the incorrect information of articles. These figures are a fair representation of a population distribution and overall performance averaging with few outliers in each city adjusting for the movement of results.

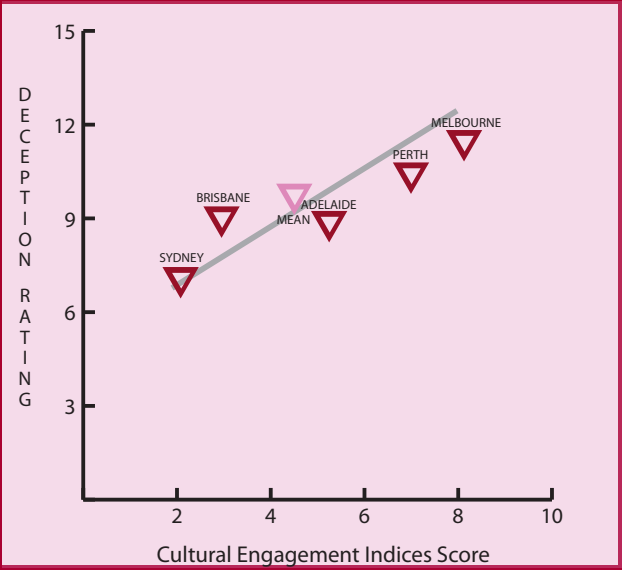
Cultural Engagement Indicator (CEI) surveys demonstrated a clear divergence between cities showing

	SYDNEY	MELBOURNE	BRISBANE	PERTH	ADELAIDE	Mean
Recreation Hours	25.4*	45.6**	32.2	41.3*	36.5	36.2
Working Hours	49.2*	41.3	43.5	41.2	45.0	40.9
Resting Hours	45.3	40.1	49.3	52.0*	56.1*	48.7
Books per month	1.2	3.5*	2.1	2.3	1.3	2.5
Films per month	4.5	3.1	2.3	5.0	3.6	3.2
Events per month	1.5	4.6**	2.5	1.2	0.9	.7

Table 3: Correllations between a variety of cultural indicators and the overall correct responce scores for each city. Groupings are arranged between recreational hours, working hours and resting hours. Books, films and events per month were grouped together.

	SYDNEY	MELBOURNE	BRISBANE	PERTH	ADELAIDE	Mean
CEI Raw	0.235*	0.781*	0.426	41.3*	36.5	36.2
CEI Adjusted	1.250	4.530	2.500	41.2	45.0	40.9

Table 2: Cultural Engagment Indices for each city as matched against the mean cities. * Denotes significant difference between the mean.



Graph 2: CEI scores against total deception rating in each city. Cities are noted as marked with the Australian mean in lighter colour. Regression correlations above (R= -0.248, P= 0.001)

an overall independent exponential smoothing. Higher rates of social interaction were recorded. In cities where skepticism was markedly higher than the mean. Indicators showed regressional relationships between recreational hours, events attended and CEI adjusted ($P < 0.001$, 0.002 respectively). There was shown to be negative influence on resting hours and books per month ($P = 0.02$) (see Table 3) .

Regression correlations between city population deception exposure factors and cultural indices showed three significant and positive influences and one significant and negative influence. For events per month ($R = 0.235$, $P<0.001$), recreation hours ($R = 0.356$, $P<0.001$), and adjusted CEI ($R= 0.360$, $P = 0.04$) which all indicated a positive correlation towards increased skepticism. Working hours ($R= -0.168$, $P=0.03$) showed a strong negative influence on level of deception amongst each population group (See Figures 1.2 and 1.3)

DISCUSSION

Test results indicate a significant difference between populations of Australia in regards to individual ability to assess false information, despite controlling for factors known to influence an individual's ability to believe credible information[43]. Furthermore these differences seem to be explained by an element of social interaction and cultural engagement.

Results demonstrate that despite unsatisfactory examination in previous studies this study has shown that sociocultural influences seem to be having some pull on the credibility assessment ability of each city's individuals. Strong correlations between recreational activities and skepticism indicates that individuals are more critical of information, and may be more willing to research the background of information.

These demonstrate a strong influence brought about by a degree of self-education. While this study does not conclusively link skeptical thinking with a wider breadth of cultures, there remains a long standing hypothesis that a person's cultural experiences may beneficially add to their skepticism. Though it was not coved in this survey there would be room to produce a further study using tandem focus groups between those who have experienced international travels in their own time and those that have resided in this cournty their entire lives. Predicted results may show that interaction with many different nationalities and their cultures may be more beneficial to skeptical thought.

Metropolitainism stands as one of the major indicators of other skills including time management, language ability, vocabulary and general knowledge[43] [8] [44] [45]. Using similar techniques it would be possible to investigate whether a person's susceptibility to deception for incorrect information is in some way linked to metropolitainism. Further investigation is needed.

Interpreting these results indicates that to a high degree individuals in large metropolises with high work hours tend to dedicate less time to investigating sources. There is a notable laxing in judgment of credibility in those with little recreational time. It is unclear what this recreation time is primarily used on, thought there are wise indications that it is being used efficiently to live a fulfilling life absorbing a cities cultures, but it is highly unlikely that this time is being used to sure up critical thinking skills, leaving a slight indication that these skills can be learnt through a general lowering of cultural inhibitions and a post-materialist embrace of what constructs result in such a modern, high-elasticity cultural spread.

The credibility of sources does seem to be more common an issue, as supported in research regarding he future of education and politics online[46] [47] and it is an important issue to pursue such that the members of our society reach a full understanding of the quality of the information that is received via expanding media platforms. In a future society where the

consumption of media will be more pervasive and invasive than in any other, the ability to maximize ones critical thinking approach to new material will be of increasing importance in spheres of employment, education, finance and overall social interaction with others.

It is important in particular that Australia residents maintain and develop a keen set of skeptical thinking tools in order to manage new challenges to the nation. Skeptical thinkers are required to gain greater insight on many of the policies that will go on to influence our society long in to the future. Recent examples where a wiser society would have benefited public debate are discussions about global warming, genetic modification, vaccination health scares and the growing threat of irrational thought spawned by religion. These cases serve as perfect examples of deceptive thinking in action, where the media and independent sources spread various mistruths about these issues. Ideally the less naive and gullible a society, the more advanced and positive an environment it will be for those citizens.

CONCLUSIONS

In studying the ability of individuals to access the credibility of information in populations across Australia this extensive survey found that individuals living in Melbourne were significantly less likely to be deceived by erroneous information, meanwhile those populations living in Sydney were the most likely to trust the credibility of completely fictitious information. It seems that the cultural influences in an environment, such as places for social recreational activities, play some role in raising an individual's skepticism towards suspect information. Though there were strong correlations between populations that scored well in detecting deception, further research is required.

ACKNOWLEDGEMENTS

Dr. Varnsen wishes to thank all the research staff at the Levitt Insititue Sydney, Melbourne and Perth and all the other research volunteers. Support staff at Macquarie University, Murdoch University, Bond University and La Trobe University for their assistance in the collection of data. The above research could only be made possible thanks to the funding of the Social Sciences Research Council and the National Education Board. Special thanks to the assistance of Librarians at the National Libraries for selecting clippings.

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