Social Marketing @ Griffith

Evaluation of a Variable Message Sign Campaign

Final Report
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Executive Summary

This report for Redland City Council summarises the survey results for the Variable Messaging Signs (VMS) campaign. A repeated measure pre-post design was used to understand how resident's thoughts and feelings changed as a result of exposure to VMSs. The overall aim of this survey was to understand whether the VMS campaign was effective. To assess effectiveness of VMS social norms, awareness, intention and self-reported behaviour to reduce speed as a result of exposure to VMS and remaining alert afterwards was examined. A total of 195 surveys were collected (112 prior to the introduction of two VMS (pre) and 83 following the introduction of VMS (post)).

The results indicate that VMS was effective. The majority (93.6%) of respondents could recall the VMSs (without being prompted) and about half of the respondents reported that they noticed both types of VMSs. Results indicated that the Koala signs offered the higher recall rate compared to the Smiley sign. The social norm of reducing speed at VMSs, koala awareness, and the self-reported behaviours of slowing down at VMSs and remaining alert after passing the VMS, were all found to be significantly improved following the introduction of VMS. Three out of four intentional items were stronger after the introduction of VMS's.

It is recommended that VMS be installed given they are remembered, and they assist drivers to remain alert for koalas. Utilisation of Koala signs is recommended moving forward given recall was higher for the koala VMS when compared to the smiley VMS. The locations, messages, and periods of utilizing such VMSs should be further tested.

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Background and Method

This report evaluates the effectiveness of a Variable Message Sign (VMS) campaign. Two different types of VMSs (Koala sign and Smiley sign) were trialled in September to December 2018 in Ormiston, Redland City Council. The two types of VMSs were installed to reduce traffic speed and to prompt increased driver vigilance following sign exposure. The two types of VMSs had similar messages but were delivered in visually different ways to the driver. The Koala sign was displayed with a photo of a koala with the word “KOALA CROSSING”. The Koala signs displayed ‘THANK YOU!’ in green at low speed, ‘STAY ALERT’ in yellow at medium speeds, and ‘SLOW DOWN’ in red at high speeds. Conversely, the Smiley sign displayed a green smiling face image at low speeds, a small yellow smiling face image with ‘BE ALERT’ below it at medium speeds, and a small red sad face image with ‘SLOW!’ below it at high speeds.

Surveys were sent to Ormiston residents prior to sign installation in September 2018. Surveys were sent to Ormiston residents in January/February 2019 following the VMS implementation period. The pre and post surveys were identical with one exception. Specifically, recall questions were added to the post surveys to gain further feedback on VMS. In the post survey respondents were asked whether they had seen any VMSs, where, and what messages were shown in the VMSs. Both surveys contained social norm, awareness, intentional, and behavioural questions (e.g., “Do you slow down at VMSs?”; “Do you become more alert after passing VMSs?”), as well as demographic questions such as age and gender. Please refer to Appendix A for the survey questionnaire.

Survey invites were posted by mail to 500 households before and after the VMS installation in Ormiston. On both occasions, residents could choose to complete surveys online (a short link was added to the mailed survey) or using the provided paper hard copy and reply paid envelope. A total of 195 surveys were collected (112 from pre and 83 from post). Data was cleaned and analysed. Descriptive frequencies, independent sample t-tests, Chi-Square tests and one-way ANOVA were conducted using SPSS to evaluate the effectiveness of the VMS campaign.

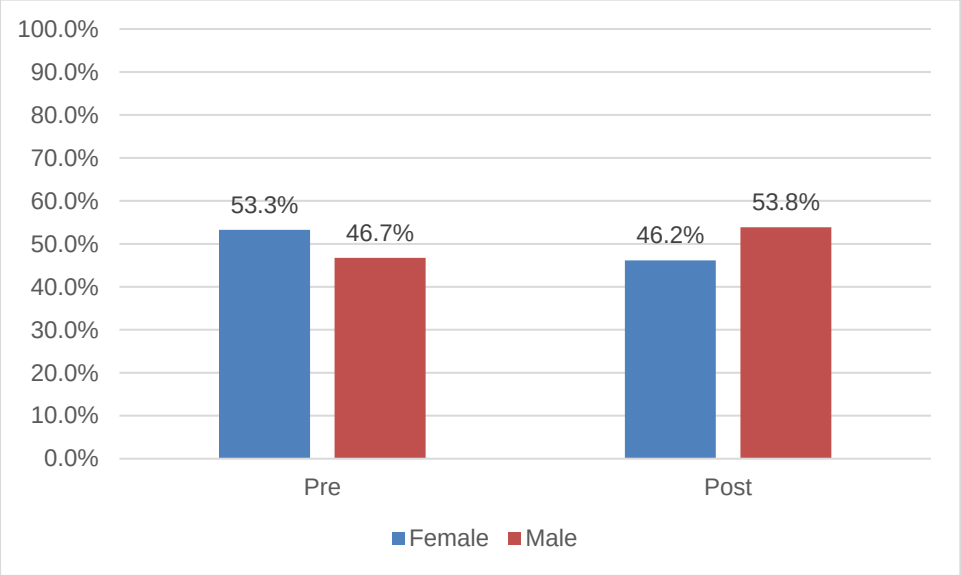
This report presents the main findings from the pre-post surveys, including campaign recall and pre-post comparison of various outcome measures. Recommendations are outlined.

Findings

Respondents' characteristics

Respondents were asked three demographic questions: postcode, gender, and age. All respondents resided with the Ormiston suburb (postcode: 4160), which was the location for the installation of the two VMS. The average age of participants in the pre survey was 47.6 and the average age of participants in the post survey was 51.3. Almost half of the respondents were female. Gender distributions are included in Figure 1 below.

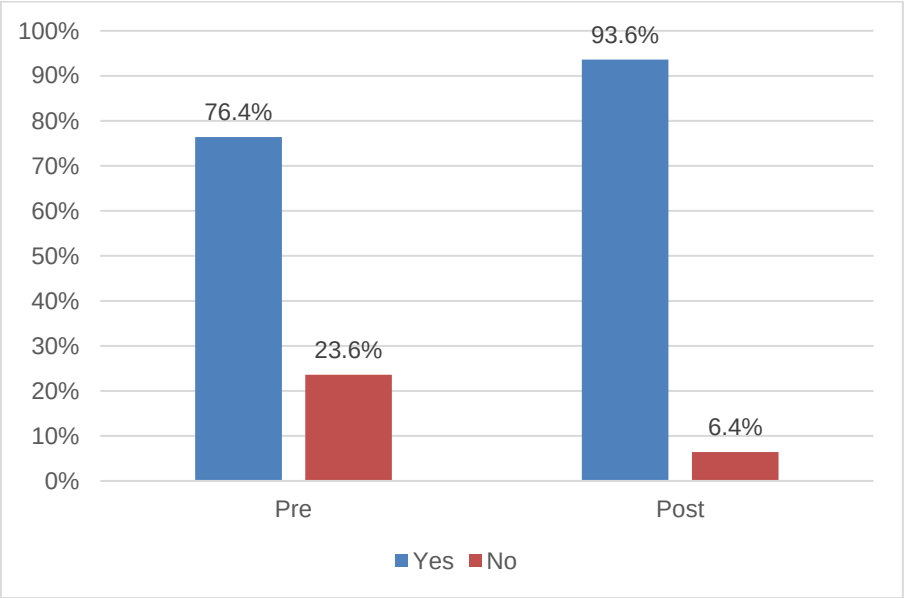
Figure 1. Gender distribution



Recall of VMSs

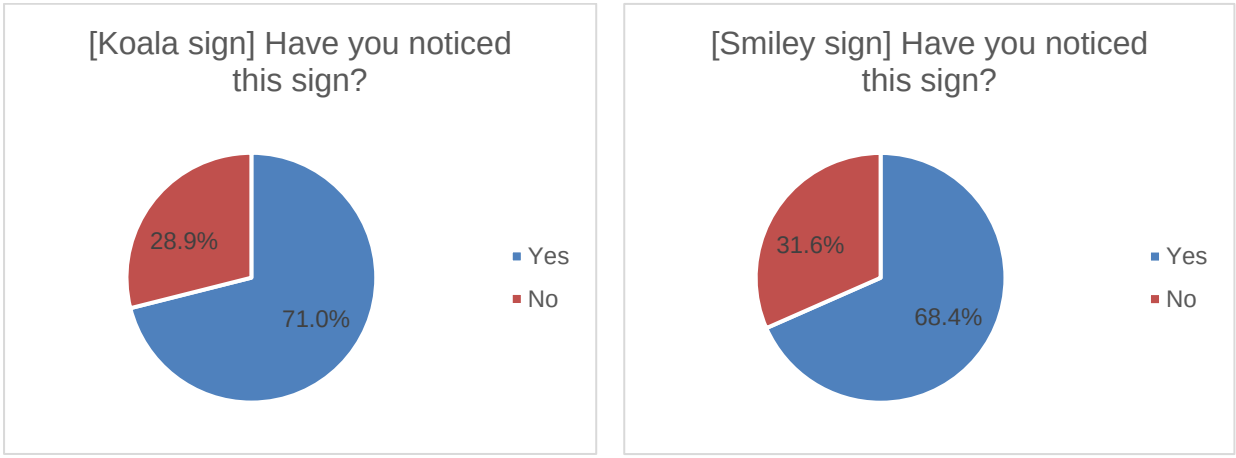
Respondents were asked to recall whether they have noticed any VMSs in the Ormiston area in the last month. Without providing any graphic information, this type of unaided recall question provides the most reliable indication of participants' level of recall. Results showed that while 76.4% of the respondents could recall VMSs in the pre survey, this increased to 93.6% in the post survey. Chi-square tests indicate this change is significant (Pearson Chi-Square = 9.835, df = 1, p = 0.002). See Figure 2 for more details.

Figure 2. Have you noticed VMSs in the Ormiston area in the last month?



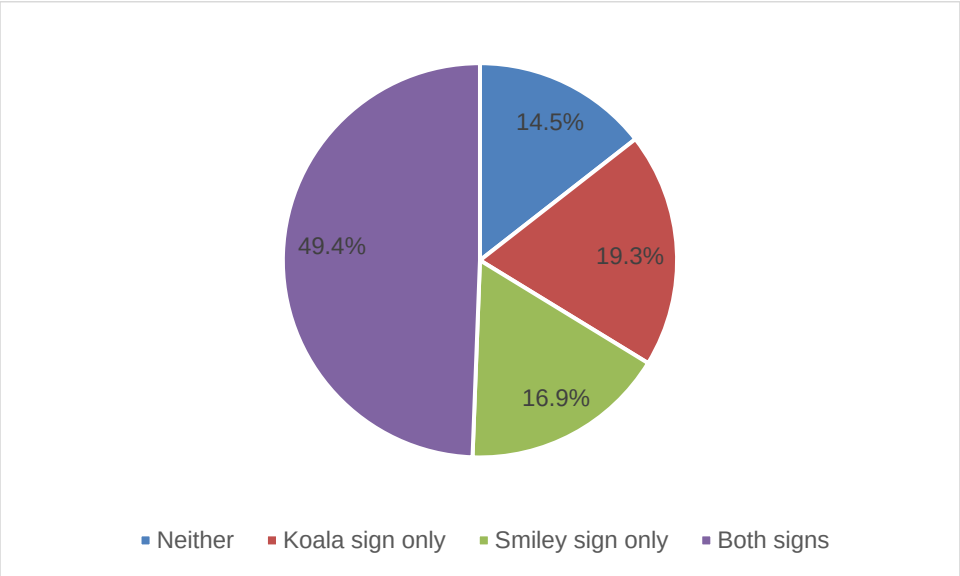
Further to the unaided recall, two sets of aided recall questions were asked, along with pictures of both types of VMSs (Koala sign and Smiley sign). Findings indicated that 71% of the respondents could recall the Koala sign, compared to 68.4% who could recall the Smiley sign. See Figure 3 for more details.

Figure 3. Aided recall of both signs



Moreover, about half of the respondents (49.4%) were found to be able to recall both signs, 19.3% could only recall the Koala sign, 16.9% could only recall the Smiley sign, and about 14.5 of respondents could not recall any sign. See Figure 4 for more details.

Figure 4. Aided recall – four groups



Social norms

Two normative measures were used in order to test whether the VMSs can impact the perceived social norms of reducing speed at VMSs. Participants were asked to indicate their scale of agreement with the following two statements (1 = strongly disagree, 7 = strongly agree) in both the pre and post surveys:

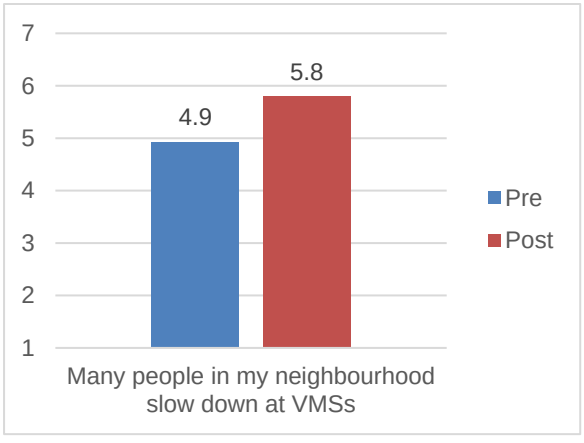
> *Many people in my neighbourhood slow down at VMSs*

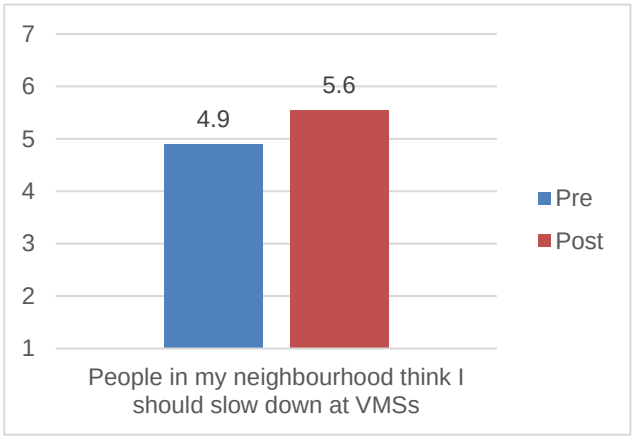
And

> *People in my neighbourhood think I should slow down at VMSs.*

Using independent sample t-tests, the results indicate the VMSs significantly increased respondents' social norms to reduce speed at VMSs. For the first statement, the average agreement increased from 4.9 to 5.8 ($t = -4.137$, $df = 184$, $p = 0.000$). For the second measure, average agreement increased from 4.9 to 5.6 ($t = -2.848$, $df = 182$, $p = 0.005$). See Figure 5 for more details.

Figure 5. Social norm scales





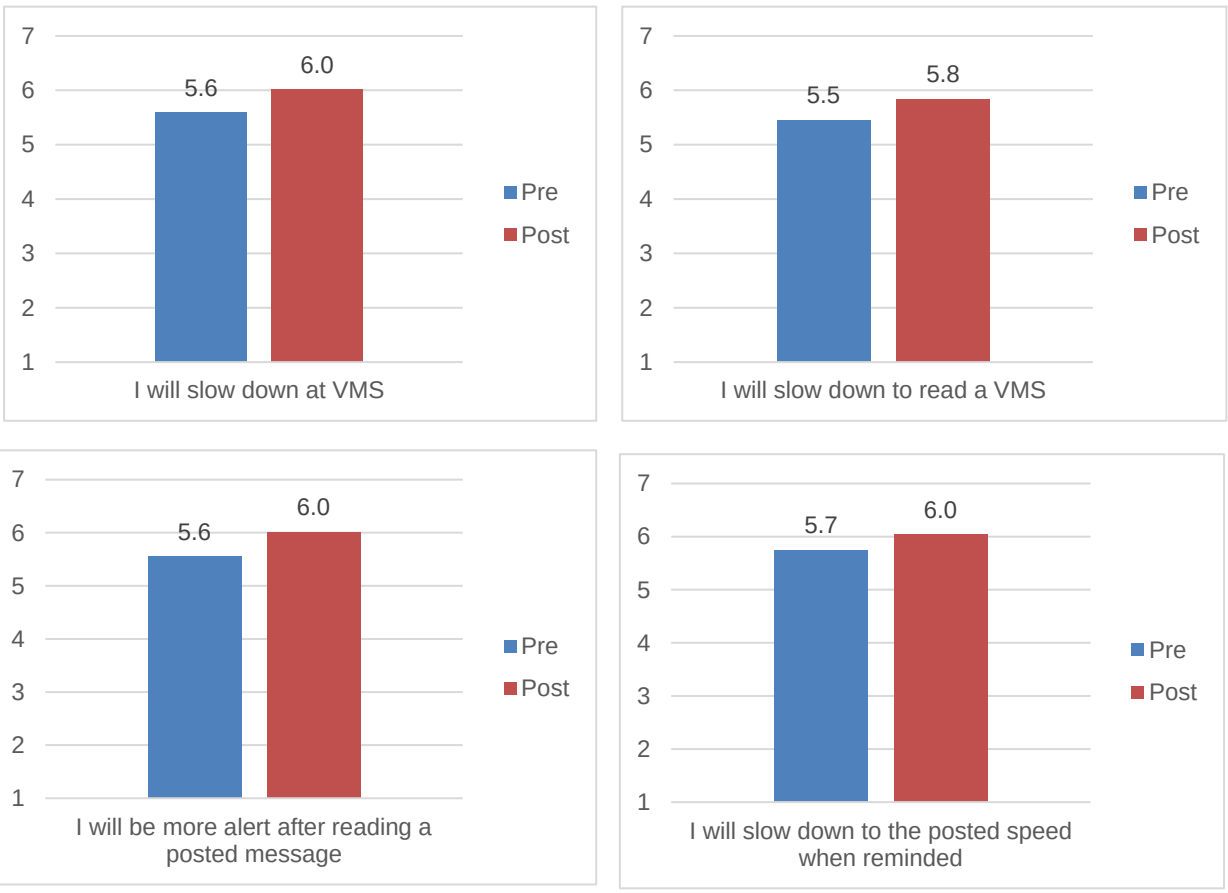
Intentions

Four intentional measures were used in order to test whether the VMSs can impact the intention to reduce speed at VMSs or whether VMS could assist drivers to remain vigilant. Similarly, participants were asked to indicate their scale of agreement (1 = strongly disagree, 7 = strongly agree) in both the pre and post surveys.

Using independent sample t-tests, the results indicate the VMSs significantly improved three out of four types of intentions. These were intention to slow down at VMSs ($t = -1.587$, $df = 183$, $p = 0.043$), intention to slow down to read a VMS ($t = -2.037$, $df = 184$, $p = 0.029$), and intention to be more alert after reading a posted message ($t = -2.556$, $df = 184$, $p = 0.011$). One intentional scale (intention to slow down to the posted speed when reminded), however, was not significantly improved ($p = 0.114$). However it is noteworthy that all four intentional scales were already highly positive in the pre survey. See

Figure 6 for more details.

Figure 6. Intentional scales



Koala awareness

Two koala awareness measures were used in order to test whether the VMSs can improve residents' koala awareness. Participants were asked to indicate their scale of agreement with the following two statements (1 = strongly disagree, 7 = strongly agree) in both the pre and post surveys:

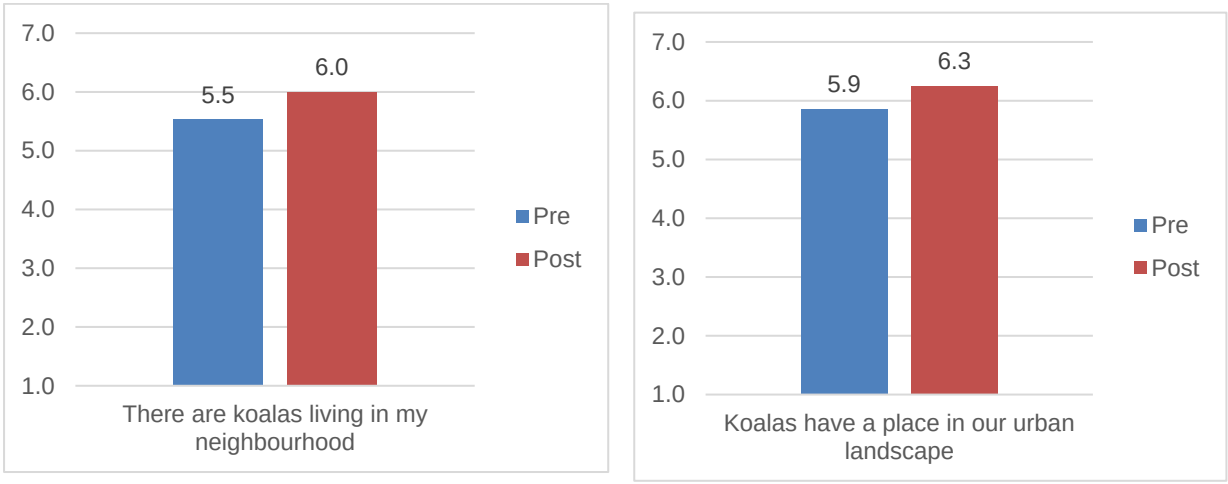
There are koalas living in my neighbourhood

And

Koalas have a place in our urban landscape

Using independent sample t-tests, the results indicate both statements were significantly improved. For the first statement, the average agreement increased from 5.5 to 6.0 ($t = -2.185$, $df = 185$, $p = 0.042$). For the second one, the average agreement increased from 5.9 to 6.3 ($t = -2.048$, $df = 185$, $p = 0.042$). See Figure 7 for more details

Figure 7. Koala awareness scales

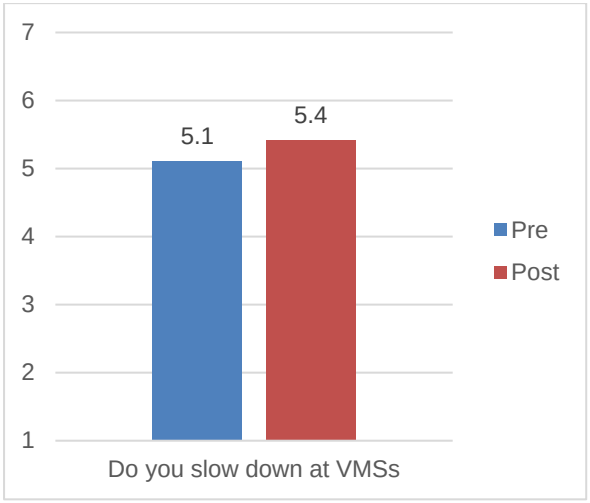


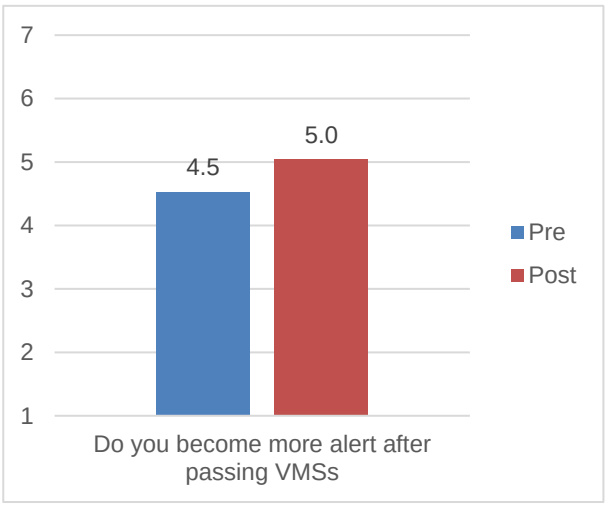
Self reported behaviours

Two self-reported behavioural measures were used in order to test whether respondents reduced their speed at the VMSs and whether they become more alert after passing VMSs. Similarly, participants were asked to indicate their scale of agreement (1 = strongly disagree, 7 = strongly agree) in both the pre and post surveys.

Using independent sample t-tests, the results indicate both statements were significantly improved. The self-reported behaviour of reducing speed at VMSs increased from 5.1 to 5.4 ($t = -2.254$, $df = 179$, $p = 0.012$). The self-reported behaviour of becoming more alert after passing VMSs increased from 4.5 to 5.0 ($t = -2.880$, $df = 179$, $p = 0.004$). See Figure 8 more details.

Figure 8. Behavioural scales





Conclusion and recommendations

Key insights

This report for Redland City Council summarised the survey results, which aimed to assess the effectiveness of two VMS, which were installed in Ormiston in October 2018. The overall aim of the repeated measure survey administered to 500 Ormiston households was to understand whether the VMS campaign was effective in increasing Redlands residents' social norms, awareness, intentions and self-reported behaviour to reduce speed at VMSs and remain koala alert afterwards. The key insights from this evaluation are summarised below:

- VMS recall rates were high – 93.6% of the respondents could recall the VMSs without being prompted, representing a significant increase from the baseline. About half of the respondents reported that they noticed both types of VMSs.
- The Koala sign had higher reported recall rates when compared to the Smiley sign.
- The social norms of reducing speed at VMSs were significantly improved. Perceptions that other people in the neighbourhood reduced speed at VMS was increased from baseline to follow up.
- Three out of four intention measures were improved by the VMS campaign. The intention to slow down to the posted speed did not change as a result of exposure to the VMS suggesting there is room for message development and testing to achieve larger reductions in speed.
- Respondents reported that they slowed down at VMSs and remained alert after passing the VMS. It is important to consider that self-reports of driving behaviour may be impacted by social desirability biases. Self-reported measures should be compared to driver monitoring data.

Recommendations

Based on the results of this report, the following recommendations are made:

- Placement of more VMSs are recommended given that VMS make drivers more aware. This could be particularly useful at specific times of the year such as breeding or dispersal seasons. Drivers reported slowing down (although not to recommended rates) and being more vigilant as a result of the signs.
- The utilisation of signs with a koala picture is recommended to continue, since findings showed better recall for this pilot study. However, it is recommended to further test variations of koala signs such as with/without flashing lights, and or with/without flashing lights on smiley faces and such to further determine response to different design and stimulations.
- The locations, messages, and periods of utilizing such VMSs should also be further tested, considering the short timeframe and limited implementation of this trial (15 weeks long in one suburb). It is recommended to conduct further trials using infield controlled experiment to compare the effectiveness between groups such as during non-koala breed seasons versus koala breeding seasons, populated areas vs non-residential areas, and different types of messages (e.g., positively versus negative framed messages). The frequency of changing the warning messages to avoid wear-out effects and to retain vigilance should also be further investigated.
- Respondents self-reported that the two VMS did not encourage them to slow down to the recommended speed limit. Future research is recommended to develop VMS with drivers. Co-design is proposed as a method that should be implemented to understand what messages would encourage drivers to slow down to the speed limit. Research to test effectiveness of the VMS developed following co-design is recommended. Techniques such as eye-tracking and EEG can be used to examine effectiveness prior to VMS installation.
- A longitudinal research design ensuring the sample is matched pre to post is recommended to further increase the quality of the outcome evaluation. Matched samples are recommended given they bring additional methodological rigor to evaluate the effectiveness of the campaign. Future survey administration could be conducted using face to face methods. Utilisation of increased incentives at follow up are recommended to further increase response rates at follow up.

Authors

Dr. Bo Pang is a Research Fellow at Social Marketing @ Griffith. Bo holds a PhD in Social Marketing and offers extensive experience in conducting research and delivering programs in the field of social marketing, all of which are published in leading scholarly journals. Bo's work involves implementing theoretical constructs into empirical community interventions and he offers experience delivering changes benefitting community across a diverse range of projects implemented in community trials for local, State and National governments. Bo has also worked with a wide array of profit and not for profit organizations. His work has been published in over 30 refereed journal articles, conference papers, and research reports.

Dr. Patricia David is a Research Fellow at Social Marketing @ Griffith. Her research interests are motivated by understanding what drives behavioural change. Patricia's PhD focussed on advancing the Social Marketing field by taking the first steps toward the development of a Theory of Behaviour Change. Patricia was awarded a Griffith University Postgraduate Research Scholarship to undertake her Ph.D. Her work is award winning. Her behaviour change research won a commendation award in the ESMC conference in 2018 and the Doctoral Colloquium Contribution to Theory & Knowledge Award in the ANZMAC conference in 2016. Patricia has led teams in research projects, working with both quantitative and qualitative approaches. She has previously worked in marketing management positions, and her current work focuses on the design, implementation and evaluation of campaigns and social marketing programs across a broad range of social issues.

James Durl is a PhD candidate and Research Assistant with Social Marketing @ Griffith. Holding a Bachelor of Business with Honours, James brings the learnings of numerous experiences working across academic and industry projects. These experiences have provided him with robust skills in systematic literature reviews, co-designing with end-users to improve program models and create new services, managing high quality reports for clients with quick turnarounds, and providing education for illicit substances to Australia's adolescent population. With a growing list of publications and awards for his work, noteworthy projects that James has worked on include the Blurred Minds alcohol education program (see http://blurredminds.com.au/) and VicHealth's TeamUp program. Over time James work has worked in projects conducted in partnership with Queensland Catholic Education Commission, VicHealth, Redland City Council and Johnson and Johnson Innovation.

Erin Hurley is a Research Assistant at Social Marketing @ Griffith. Erin's research interests are in the areas of social marketing, health behaviour, alcohol education and co-design. She is currently working on projects delivering changes to the environment, people's health and for the greater social good. Erin offers experience in social research and analysis, delivering reports within specified project timeframes to client satisfaction. Research partners include the Department of Environment and Heritage Protection, Queensland Police Service, Redland City Council and Queensland Catholic Education Commission.

Professor Sharyn Rundle-Thiele is Director, Social Marketing @ Griffith. Drawing on her commercial marketing background Sharyn's work applies marketing tools and techniques to deliver changes for the better. Working in partnerships, Sharyn has led projects that increase healthy eating, change adolescent attitudes to alcohol drinking (www.blurredminds.com.au), reduced food waste and increased dog's abilities to avoid koalas (see www.leaveit.com.au). Key project partners in 2019 are Defence Science and Technology Organisation, Australian Defence Force, Queensland Catholic Education Commission, Redland City Council, National Association of Charitable Recycling Organisations, Department of Environment and Science (Qld), Johnson and Johnson Innovation, and more. Sharyn's work is evidence based and award winning. She has published more than 130 books, book chapters and journal papers.

Appendix A: Survey questions

Have you noticed Variable Message Signs (VMS) (road signs with flashing messages) other than school zone signs in the Ormiston area in the last three months?

Please choose only one of the following:

○ Yes

○ No

Have you seen this VMS in the Ormiston area? (Post survey only)

Where have you seen this VMS? (Post survey only)

Please write your answer here:

What message was shown on this VMS? (Post survey only)

Please write your answer here:

Have you seen this VMS in the Ormiston area? (Post survey only)

Where have you seen this VMS? (Post survey only)

Please write your answer here:

What message was shown on this VMS? (Post survey only)

Please write your answer here:

For me slowing down at VMS is:

Please choose the appropriate response for each item:

	-3	-2	-1	0	1	2	3	
Harmful	○	○	○	○	○	○	○	Beneficial
Bad	○	○	○	○	○	○	○	Good
Worthless	○	○	○	○	○	○	○	Valuable
Boring	○	○	○	○	○	○	○	Exciting
Unpleasant	○	○	○	○	○	○	○	Pleasant

	-3	-2	-1	0	1	2	3	
Unenjoyable	○	○	○	○	○	○	○	Enjoyable

Please indicate your agreement with the following statements (strongly disagree = -3, strongly agree = 3)

	-3	-2	-1	0	1	2	3
Many people in my neighbourhood slow down at VMSs.	○	○	○	○	○	○	○
People in my neighbourhood think I should slow down at VMSs.	○	○	○	○	○	○	○
I will slow down at a VMS.	○	○	○	○	○	○	○
I will slow down to the posted speed when reminded.	○	○	○	○	○	○	○
I will slow down to read a VMS.	○	○	○	○	○	○	○
I will be more alert after reading a posted message.	○	○	○	○	○	○	○
Slowing down at a VMS is inconvenient.	○	○	○	○	○	○	○
Slowing down at a VMS will keep the roads safe.	○	○	○	○	○	○	○
Slowing down at a VMS will increase my travel time.	○	○	○	○	○	○	○

Do you slow down at VMSs?

○ Never

○ Very rarely

○ Rarely

○ Occasionally

○ Very frequently

○ Always

Do you become more alert after passing VMSs?

○ Never

○ Very rarely

○ Rarely

○ Occasionally

○ Very frequently

○ Always

Please indicate your agreement with the following statements (strongly disagree = -3, strongly agree = 3)

	-3	-2	-1	0	1	2	3
Ignoring VMSs may cause wildlife fatalities.	○	○	○	○	○	○	○
It is important to keep wildlife safe.	○	○	○	○	○	○	○
VMSs may reduce wildlife road kills.	○	○	○	○	○	○	○
Slowing down at a VMS will keep wildlife safe.	○	○	○	○	○	○	○
There are koalas living in my neighbourhood.	○	○	○	○	○	○	○
Koalas have a place in our urban landscape.	○	○	○	○	○	○	○

Your gender:

○ Female

○ Male

What is your current age in years?

Please write your answer here:

What is your postcode?

Please write your answer here:

You will receive two coffee vouchers if you are one of the first 100 to complete the survey. Please leave your email address so we can re-contact you.

Please write your answer here:

Thank you for participating