ORIGINAL ARTICLE

Car manufacturers and global road safety: a word frequency analysis of road safety documents

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Objective: The World Bank believes that the car manufacturers can make a valuable contribution to road safety in poor countries and has established the Global Road Safety Partnership (GRSP) for this purpose. However, some commentators are sceptical. The authors examined road safety policy documents to assess the extent of any bias.

Design: Word frequency analyses of road safety policy documents from the World Health Organization (WHO) and the GRSP.

Main outcome measures: The relative occurrence of key road safety terms was quantified by calculating a word prevalence ratio with 95% confidence intervals. Terms for which there was a fourfold difference in prevalence between the documents were tabulated.

Results: Compared to WHO's *World report on road traffic injury prevention*, the GRSP road safety documents were substantially less likely to use the words speed, speed limits, child restraint, pedestrian, public transport, walking, and cycling, but substantially more likely to use the words school, campaign, driver training, and billboard.

Conclusions: There are important differences in emphasis in road safety policy documents prepared by WHO and the GRSP. Vigilance is needed to ensure that the road safety interventions that the car industry supports are based on sound evidence of effectiveness.

Every day, worldwide, around 30 000 people are seriously injured in road traffic crashes.¹ Most of these are in low and middle income countries, and most of the casualties are pedestrians and cyclists. The World Bank believes that a partnership between business, non-governmental organizations, and governments in these countries can deliver substantial road safety improvements and has established the Global Road Safety Partnership (GRSP) for this purpose.² The partnership includes the car makers General Motors, Ford, Daimler Chrysler, and Volvo, and the drinks multinationals Bacardi-Martini and United Distillers. However, concern has been raised that companies may only support initiatives that serve their commercial interests, rather than implementing evidence based interventions.³ We examined this concern by conducting word frequency analyses of road safety documents from the GRSP and the World Health Organization (WHO).

METHODS AND RESULTS

We quantified the prevalence of road safety terms in the summary report of the *World report on road traffic injury prevention* prepared by WHO and the World Bank⁴ (26 742 words excluding references) and in the combined annual reports (2003–05) of the GRSP (31 548 words).² We compiled a glossary of road safety terms that included words for the different categories of road user (pedestrian, cyclist, passenger) and for different types of road safety intervention. We used word count software to count the occurrence of the words in the documents and the total word count. We divided the total number of occurrences of the relevant words by the total number of words in the document to give the prevalence of each word per 10 000 words. We compared the occurrence of words between the two documents by calculating a word prevalence ratio with 95% confidence intervals. We decided a priori that we would present those words for which there was a fourfold difference in prevalence between the documents. In the case of words that were not

mentioned in one document, we presented them if their prevalence in the other document was greater than one in 10 000 words. Table 1 shows the results. Compared to the *World report on road traffic injury prevention*, the GRSP documents were substantially less likely to use the words speed, speed limits, child restraint, pedestrian, public transport, walk, walking, cycling, and cyclist, but substantially more likely to use the words school, campaign, driver training, and billboard.

CONCLUSIONS

After the establishment of the GRSP, there were some concerns that car makers would be unlikely to promote initiatives that conflict with their commercial interests.³ Our analyses provide little reassurance in this respect. For example, whereas the *World report* emphasizes the importance of speed reduction, particularly to promote the safety of pedestrians, a recommendation that is based on strong evidence, the GRSP documents emphasize driver training and safety education campaigns, which is contrary to the available research evidence.

We used an objective method to assess differences in emphasis between documents. We have previously used word frequency analyses to identify optimal search strategies for systematic reviews.^{5–6} Although word frequency analysis is similar in some respects to discourse analysis, a technique that has been widely used in the analyses of policy documents, our use of word frequency analysis in this particular context is novel and our results should be seen as preliminary, warranting further detailed investigation.

There are some methodologic limitations that deserve careful consideration. First, the use of a word does not necessarily imply the promotion of a particular intervention. For example, the GRSP may have referred to driver training

Abbreviations: GRSP, Global Road Safety Partnership; WHO, World Health Organization.

Table 1 Words and their prevalence in the WHO and GRSP reports

	WHO Report		GRSP 2003-05		
	Count	Prevalence (per 10k words)	Count	Prevalence (per 10k words)	Prevalence ratio WHO/GRSP (95% CI)
Terms more common in WHO report					
Speed limit	17	6.4	1	0.3	20.1 (2.7 to 150.7)
Child restraint	16	6.0	1	0.3	18.9 (2.5 to 142.3)
Restraint	24	9.0	2	0.6	14.2 (3.3 to 59.9)
Speed	53	19.8	5	1.6	12.5 (5.0 to 31.3)
Truck	28	10.5	3	1.0	11.0 (3.3 to 36.2)
Serious injury	27	10.1	3	1.0	10.6 (3.2 to 35.0)
Cost	40	15.0	5	1.6	9.4 (3.7 to 23.9)
Barrier	8	3.0	1	0.3	9.4 (1.2 to 75.4)
Pedestrian	69	25.8	15	4.8	5.4 (3.1 to 9.5)
Costs	36	13.5	8	2.5	5.3 (2.5 to 11.4)
Public transport	13	4.9	3	1.0	5.1 (1.5 to 17.9)
Reduce, reduction	120	44.9	29	9.2	4.9 (3.3 to 7.3)
Walk	8	3.0	2	0.6	4.7 (1.0 to 22.2)
Breath tests, testing	7	2.6	2	0.6	4.1 (0.9 to 19.9)
Death, dead	112	41.9	33	10.5	4.0 (2.7 to 5.9)
Hospital	35	13.1	0	0.0	
Cyclist, cyclists	32	12.0	0	0.0	
Trauma	26	9.7	0	0.0	
Buses	13	4.9	0	0.0	
Disabled	13	4.9	0	0.0	
Disability, disabilities	13	4.9	0	0.0	
Compliant, compliance	13	4.9	0	0.0	
Restricted, restriction	9	3.4	0	0.0	
Sleep	9	3.4	0	0.0	
Fatigue	7	2.6	0	0.0	
Road Design	7	2.6	0	0.0	
Airbag, Air Bag	7	2.6	0	0.0	
Cycling	6	2.2	0	0.0	
Camera	6	2.2	0	0.0	
Driving while under the influence	6	2.2	0	0.0	
Trauma care	6	2.2	0	0.0	
Older	6	2.2	0	0.0	
Walking	5	1.9	0	0.0	
Rumble strip	5	1.9	0	0.0	
Roundabout	5	1.9	0	0.0	
Random breath test(s,ing)	4	1.5	0	0.0	
Compatibility, compatible	4	1.5	0	0.0	
Rail	3	1.1	0	0.0	
Bump	3	1.1	0	0.0	
Break, breaks	3	1.1	0	0.0	
Elderly	3	1.1	0	0.0	
Convenience	3	1.1	0	0.0	
Terms more common in GRSP report					
Global Road Safety Partnership	1	0.4	52	16.5	0.02 (0.003 to 0.2)
School	2	0.7	48	15.2	0.05 (0.012 to 0.2)
Town	1	0.4	15	4.8	0.1 (0.01 to 0.6)
National	10	3.7	92	29.2	0.1 (0.07 to 0.2)
Heavy goods	1	0.4	9	2.9	0.1 (0.02 to 1.0)
Campaign	13	4.9	88	27.9	0.2 (0.1 to 0.3)
Plans, plan	8	3.0	38	12.0	0.2 (0.1 to 0.5)
GRSP	0	0.0	583	184.8	
Sustainability	0	0.0	17	5.4	
Traffic Garden	0	0.0	5	1.6	
Shared	0	0.0	3	1.0	
Driver training	0	0.0	3	1.0	
Billboard	0	0.0	3	1.0	

GRSP, Global Road Safety Partnership; WHO, World Health Organization.

in the context of an intervention that has been shown to be ineffective.⁷ Careful reading of the GRSP documents however, does not support this interpretation. Second, the GRSP annual reports may have focused on particular projects, so that the word counts from the annual reports do not represent their work more generally. We avoided this to some extent by analyzing the content of three annual reports rather than the report for a single year; nevertheless this possibility remains open to question. We accept that annual reports may be superficial and may not provide an in-depth picture of the activities of a particular organization. We examined annual reports, rather than the GRSP road safety strategy documents,⁸ because we wanted to assess what the partnership actually does, rather than what it believes that it

should be doing. We do not doubt the depth of road safety expertise within the partnership. The concern we sought to address is whether the GRSP would be able to persuade its commercial partners, many of which are motor manufacturers, to fund road safety initiatives that might be seen to conflict with their commercial interests. Finally, the glossary was compiled by the authors and we may have included a biased selection of terms. Although the glossary was compiled before the analyses were undertaken, we accept that there is still the potential for bias.

Implications for prevention

Although we welcome the contribution of the car makers in tackling the global road safety epidemic, we believe that

Key points

- There were important differences in emphasis between the road safety activities of the Global Road Safety Partnership (GRSP), an organization that includes several car makers, and those advocated by the *World report on road traffic injury prevention* by the World Health Organization and the World Bank. Those of the GRSP were less likely to be supported by strong scientific evidence.
- Vigilance is needed to ensure that road safety policies promoted by organizations with potential financial conflicts of interest are based on sound evidence of effectiveness.

vigilance is needed to ensure that the interventions that the industry supports are based on sound evidence of effectiveness.”

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LACUNAE

Stay out of that balloon!

On June 3, the bodies of two college students were found inside a giant helium balloon in Florida. The week before, a 10 year old in New Jersey collapsed at a birthday party after sucking helium from a balloon. Is helium really that dangerous? It can be. Breathing in pure helium deprives the body of oxygen, as if you were holding your breath. If you couldn't breathe at all, you'd start to die in minutes—as soon as your body exhausted the supply of oxygen stored in the blood. But helium speeds up this process. When the gas fills your lungs, it creates a diffusion gradient that washes out the oxygen. In other words, each breath of helium you take sucks more oxygen out of your system. After inhaling helium, the body's oxygen level can plummet to a hazardous level in a matter of seconds.

You don't have to worry about fatal asphyxiation if you're sucking from a helium balloon at a party. At worst you'll keep going until you get light-headed and pass out, at which point you'll stop inhaling helium and your body's oxygen levels will return to normal. Of more concern is the possibility that you'll hurt yourself when you fall down. (The boy in New Jersey bumped his head and needed three stitches.)

Of course you're putting yourself in grave danger anytime you climb inside a giant helium balloon. The college kids in Florida weren't the first to attempt this stunt. In 2002, a case report from a Japanese medical journal described a similar episode. A drunken adolescent poked his head into an advertising balloon and asphyxiated. Several authors have also reported cases of suicide by helium inhalation.

Death by helium still seems to be quite rare. US Poison Control Centers reported only two fatalities between 2000 and 2004. There's still an outcry from concerned parents whenever helium inhalation makes its way into popular culture. Federal Express had to pull a commercial that depicted the munchkins from *The Wizard of Oz* sucking balloons to keep their voices at a high pitch. Geoffrey, the Toys "R" Us giraffe, got a slap on the hoof for doing the same.

Contributed by Ian Scott. From slate.com.