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Public Opinion and Cyclist Behaviour Towards Bicycle Push Buttons for Requesting Green at Intersections

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Abstract

Traffic signals are crucial for regulating road safety, but public opinions and cyclist behaviour regarding traffic signals and push buttons have sparked discussions on social media platiorms. This study aimed to explore public opinions and cyclist behaviour related to traffic signals and push buttons by analysing social media data and empirical observations and provide recommendations to municipalities on both suitable push buttons, and communication with the public regarding traffic control.

To gather social media opinions, social media scrapers were used to collect the data, including posts from social media platiorms and news articles published by municipalities. The analysis revealed that a significant majority (77%) of the social media posts expressed negative opinions toward traffic signals. Among the negative opinions, 52% of users believed that push buttons on traffic signals were ineffective. The main reasons cited for cri□cism were concerns about push button hygiene, long waiting times at traffic lights, and safety issues at intersections. Additionally, approximately 23% of negative posts did not provide specific reasons for their criticism but expressed a negative sentiment. Understanding the reasons behind these negative opinions is essential to address them effectively.

Several factors were identified as influencing the emergence of these opinions, including influential articles published by news websites and time-dependent events such as the Covid pandemic. In response to these opinions, municipalities acknowledged citizen criticisms and implemented various strategies to address concerns. Personalized approaches, actively listening to individuals, and assuring them that their criticisms would be addressed, proved to be effective in engaging with the public. Explaining the control function for specific locations also resulted in positive reactions from 65% of respondents. However, when municipalities announced improvements to intersection layout or control without a personal touch, the reactions tended to be more negative: only 50% positive reactions for layout-related announcements and 40% positive reactions for control-related announcements. Negative reactions ranged from scepticism about effectiveness to questioning why similar solutions were not implemented elsewhere.

Concurrently, an empirical study was conducted to explore the relationship between different types of push buttons and cyclist behaviour at signalized intersections. The study made use of detector data and signal data provided by the municipality of The Hague, collected from eight intersections with 3-5 bicycle movements. Each signal for these movements was equipped with loop detectors and one of three types of push buttons: bright buttons, touch buttons, or touch buttons combined with a waiting time indicator, see Fig. 1. The bright button is a simple button which must be pushed and has small feedback lights (LEDs). The touch button indicates "wait

for green" after being touched. The traffic controller of the intersection logs the data, so-called V-Log data, with which the following events can be determined per movement:

1. The start of red and green of the signals.
2. The moment the detector is occupied.
3. The moment the button was pushed or touched a□er the start of the red signal.
4. The number of times the button was pushed during red.
5. The duration of each button press/touch.

The buttons give feedback (the LEDs or the message "wait for green") if pushed or touched, but also if a cyclist is detected by the loop detector, the button gives this feedback. The cyclist can still use the button after being detected by the loop detector, and the majority of cyclists will do so. For all movements at all intersections, and all buttons, on average in 0.7% of the cases only the button is used to request green, so without the loop detection. Averaged over the cycles, although the initial detection is done by the loop detector, the bright button is still pushed for 62% of the cases, The touch button is used in 85% of the cycles. It is unclear why this is higher since the touch button indicates the detection more clearly than the bright button. If the waiting time indicator is added, only in 44% of the cycles the button is still touched. There is only one movement with waiting time indicator, but it shows that when the remaining green time is clearly indicated, cyclists will use the button less.

There was no correlation found between the maximum waiting time and the number of button presses, suggesting that cyclists at these intersections do not express their impatience by pushing or touching the button more frequently. Further analysis showed that the touch button was touched for a longer duration compared to the bright button. In 85% of the cases, the bright button was pushed for less than 1 second, while only 45% touched the touch button for less than 1 second. Additionally, for the touch button (both with and without the waiting time indicator) a remarkable peak at 9 seconds was observed, with 8% of cyclists pressing the touch button for this extended duration. An explanation can be that the bright button gives clear tactile feedback when being pushed, which lacks for the touch button.

In conclusion, despite the presence of negative opinions on push buttons, cyclists continue to use them. Negative opinions expressed on social media often relate to concerns regarding hygiene, waiting times, and safety issues. The recommended approach for municipalities is to implement personalized strategies and provide information to address these concerns. The empirical study found no significant correlation between using the button and waiting time. However, clear detection feedback, the tactile feedback of the 'push', and a waiting time indicator is advised for enhancing user comfort and trust.

Fig 1. Left: Brightbutton, middle: Touch button, right: the Waiting Time Indicator is visible on top of an extra signal, which is close to the touch button as depicted in the middle. Figures from Vialis and Verkeerslantaarn.nl