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Investigating the influence of visuospatial stimuli on driver's speed perception: a laboratory study

Anna-Lena Köhler^{1*} , Maren Klatt¹, Irling Koch² and Stefan Ladwig¹

Abstract

Driving at an inappropriate speed is a major accident cause in the EU. Understanding the underlying sensory mechanisms can help to reduce speed and increase traffic safety. The present study investigated the effect of visuospatial stimuli on speed perception using an adaptive countermeasure to speeding based on a manipulation of optic flow. We added red lights on both sides of a simulated road. We expected speed to be perceived as faster when lights moved toward drivers due to increased optic flow, whereas we expected static light stimuli to not alter the optic flow and thus not influence speed perception. Two experiments applied the method of constant stimuli. To this end, participants encountered several trials of two video sequences on a straight road. A reference sequence showed the same travelling speed while test sequences varied around different traveling speeds. Participants indicated which sequence they perceived as faster, leading to the calculation of the point of subjective equality (PSE). A lower PSE indicates that the speed in this experimental condition is perceived as faster than in another experimental condition. Experiment 1A did not show a difference between PSEs of static and oncoming lights. Because participants had counted reflector posts for speed estimation, we removed these reflector posts in Experiment 1B and found a lower PSE for oncoming lights. Thus, such light stimuli may have an effect only in situations without other competing visual stimuli supporting speed perception. Future research should investigate whether speed perception is indeed a primarily visuospatial control task or whether other sensory information such as auditory factors can have an influence as well.

Keywords Speed perception, Safe speed, Traffic safety, Adaptive traffic intervention, Optic flow

Significance statement

Inappropriate speed remains a major cause of accidents. There is a variety of interventions aiming at lowering driving speed inappropriate for a given context. Countermeasures to speeding in the driving infrastructure can target every driver in potential areas. Understanding the mechanisms in speed perception can help to develop

better interventions. The present two experiments investigated the role of visual stimuli in speed perception based on a dynamic light-based intervention that led to lower driving speeds in a previous simulator study and field test (Köhler et al., 2022). Our findings show that oncoming lights lead to lower perceived traveling speed, but only when there are no other salient visual stimuli that support speed perception. In sum, the findings provide valuable insights for future development of countermeasures targeting speeding.

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Speed Of Perception

Guy Montrose Whipple

Speed Of Perception:

When Time Stood Still - Unraveling the Mysteries of Time Perception VIRUTI SHIVAN, Dive into the enigmatic world of time perception with When Time Stood Still This compelling book explores the intricate ways in which we experience time blending scientific research philosophical inquiry and real life anecdotes It offers readers an insightful journey into understanding how our minds perceive the passage of time the factors influencing this perception and the profound impact it has on our lives From the psychological effects of time perception on our daily routines to its influence on major life decisions this book delves into the various aspects of time consciousness It examines historical and cultural perspectives on time the neuroscience behind our internal clocks and intriguing phenomena like time dilation and temporal illusions Whether you're a science enthusiast a curious philosopher or someone fascinated by the mysteries of human cognition When Time Stood Still provides a thought provoking exploration of one of life's most profound enigmas Prepare to embark on a journey that will change the way you perceive time forever

Multidisciplinary Aspects of Time and Time Perception

Argiro Vatakis,Anna Esposito,Maria Giagkou,Fred Cummins,Georgios Papadelis,2011-11-22 This book constitutes the documentation of the scientific outcome of the first meeting of the TIMELY network the International Workshop on Multidisciplinary Aspects of Time and Time Perception which took place in Athens Greece in October 2010 The 21 papers presented were carefully reviewed and selected for inclusion in the book They cover the following topics conceptual analysis and measurement of time exploring factors associated with time perception variability extending time research to ecologically valid stimuli and real world applications and uncovering the neural correlates of time perception

Timing and Time Perception: Procedures,

Measures, & Applications ,2018-04-10 Timing and Time Perception Procedures Measures and Applications is a one of a kind collective effort to present the most utilized and known methods on timing and time perception Specifically it covers methods and analysis on circadian timing synchrony perception reaction response time time estimation and alternative methods for clinical developmental research The book includes experimental protocols programming code and sample results and the content ranges from very introductory to more advanced so as to cover the needs of both junior and senior researchers We hope that this will be the first step in future efforts to document experimental methods and analysis both in a theoretical and in a practical manner Contributors are Patricia V Agostino Rocío Alcalá Quintana Fuat Balcá Karin Bausenhart Richard Block Ivana L Bussi Carlos S Caldart Mariagrazia Capizzi Xiaoqin Chen Engel Correa Massimiliano Di Luca Cline Z Duval Mark T Elliott Dagmar Fraser David Freestone Miguel A García Pérez Anne Giersch Simon Grondin Nori Jacoby Florian Klapproth Franziska Kopp María Kostaki Laurence Lalanne Giovanna Mioni Trevor B Penney Patrick E Poncelet Patrick Simen Ryan Stables Rolf Ulrich Argiro Vatakis Dominic Ward Alan M Wing Kieran Yarrow and Dan Zakay

Cognitive and emotional mechanisms of time perception Huazhan Yin,Philip Gable,Zhijie Zhang,2023-02-06

Time Perception and Dysfunction: Clinical and Practical Implications Deana Dávalos,Giovanna Mioni,Simon Grondin,Felipe

Ortuño,2019-02-19 Processing time requires a complex set of abilities that dictates how one adapts to the environment Timing is key in how we communicate organize our space and understand the world When timing is intact it often exists below one's conscious awareness but when one's ability to process time is disrupted the effects are noticeable and widespread To better understand the construct of temporal dysfunction one has to examine the concept of timing from multiple angles An integrative approach is required to understand the possible biological cognitive and psychological etiologies of temporal dysfunction In addition expertise in language measurement and psychopathology are necessary to comprehend how timing affects one's representation of the world This Research Topic is dedicated to examining timing and temporal dysfunction across a variety of tasks and disorders Specifically we seek to understand the most basic types of timing dysfunction and how they may affect a wide range of behaviors and symptoms as well as higher levels of temporal deficits involved in how one perceives the time spent This Research Topic represents the intersection of medicine psychology cognition and perception in a unified attempt to shed light on temporal processing The collection of original research articles and case studies highlighting novel methodologies and interventions illustrates the complexity of timing dysfunction and how understanding these deficits helps us to get a fresh look at a wide range of clinical psychopathologies and to develop better interventions

Perception, 2007 **The Psychology of Time Perception** John Warden, 2016-06-09 How do people perceive time This book presents a wealth of contemporary and classical research including some of the history and philosophy of time perception Influential internal clock based models of time perception receive an in depth but non technical introduction and discussion The role of cognition and emotion in perceiving time is also explored as well as questions derived from time experience in daily life such as why time seems to pass more quickly in one situation rather than another Classical and modern research on timing in children is reviewed as well as work on time perception and time experience in older people Leading recent models of animal timing are also discussed in a non mathematical way

Manual of mental and physical tests v.1, 1914 Guy Montrose Whipple, 1914 **Engineering**, 1893 *Proceedings of the Aristotelian Society* Aristotelian Society (Great Britain), 1894 List of members in each volume **The Perceptualist** Edward John Hamilton, 1899

History of Philosophy, from Thales to the Present Time Friedrich Ueberweg, 1885 **Theoretical Models and Processes of Reading** Harry Singer, Robert B. Ruddell, 1976 A Theory of Time John Elof Boodin, 1899 *Mind*, 1885 Issues for 1896-1900 contain papers of the Aristotelian Society The International Cyclopaedia, 1900 The Human Intellect Noah Porter, 1872 The Perception of Space and Matter Johnstone Estep, 1879 Critique of Pure Reason Immanuel Kant, 1899 Metaphysicians have for centuries attempted to clarify the nature of the world and how rational human beings construct their ideas of it Materialists believed that the world including its human component consisted of objective matter an irreducible substance to which qualities and characteristics could be attributed Mind thoughts ideas and perceptions was viewed as a more sophisticated material substance Idealists on the other hand argued that the world

acquired its reality from mind which breathed metaphysical life into substances that had no independent existence of their own. These two camps seemed deadlocked until Immanuel Kant's Critique of Pure Reason endeavored to show that the most accurate theory of reality would be one that combined relevant aspects of each position yet transcended both to arrive at a more fundamental metaphysical theory. Kant's synthesis sought to disclose how human reason goes about constructing its experience of the world thus intertwining objective stimuli with rational processes that arrive at an orderly view of nature.

Comprehensive Speed Perception Louis Oppenheimer, 1976

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Table of Contents Speed Of Perception

1. Understanding the eBook Speed Of Perception
 - The Rise of Digital Reading Speed Of Perception
 - Advantages of eBooks Over Traditional Books
2. Identifying Speed Of Perception
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Speed Of Perception
 - User-Friendly Interface
4. Exploring eBook Recommendations from Speed Of Perception
 - Personalized Recommendations
 - Speed Of Perception User Reviews and Ratings
 - Speed Of Perception and Bestseller Lists
5. Accessing Speed Of Perception Free and Paid eBooks
 - Speed Of Perception Public Domain eBooks

- Speed Of Perception eBook Subscription Services
- Speed Of Perception Budget-Friendly Options

6. Navigating Speed Of Perception eBook Formats

- ePUB, PDF, MOBI, and More
- Speed Of Perception Compatibility with Devices
- Speed Of Perception Enhanced eBook Features

7. Enhancing Your Reading Experience

- Adjustable Fonts and Text Sizes of Speed Of Perception
- Highlighting and Note-Taking Speed Of Perception
- Interactive Elements Speed Of Perception

8. Staying Engaged with Speed Of Perception

- Joining Online Reading Communities
- Participating in Virtual Book Clubs
- Following Authors and Publishers Speed Of Perception

9. Balancing eBooks and Physical Books Speed Of Perception

- Benefits of a Digital Library
- Creating a Diverse Reading Collection Speed Of Perception

10. Overcoming Reading Challenges

- Dealing with Digital Eye Strain
- Minimizing Distractions
- Managing Screen Time

11. Cultivating a Reading Routine Speed Of Perception

- Setting Reading Goals Speed Of Perception
- Carving Out Dedicated Reading Time

12. Sourcing Reliable Information of Speed Of Perception

- Fact-Checking eBook Content of Speed Of Perception
- Distinguishing Credible Sources

13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
- Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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