

Describe change blindness and discuss what this phenomenon tells us about human attentional capabilities in real-world settings.

The ability to maintain our attention span to detail differs for every individual, to not be able to notice changes in our environment, in small amounts, 'However, the existence of change blindness does not on its own necessitate sparse representations – it could occur even with fairly detailed and complete visual representations of a scene,' (Simons & Rensink, 2005) or large amounts, can be challenging for some people. The phenomenon that is change blindness has caught the attention of many psychologists, creating various questions such as how and why this may occur. The definition of change blindness is that of the visual inability to notice change of an environmental stimuli by the observer, 'the inability to detect changes to an object or scene' (Simons & Levin, 1997). For many, it may often be the case that when your attention is placed on a specific object or situation, your attention abilities fail to pick up on the 'background' information, many variables in our environments contribute to the lack of attention to certain stimuli, such as, colours, fast movements, possibly sound and or smell; the overpowering of one sense may leave the ability to notice something visual, to fall short. It is important to get into depth about the subject, examining the history of this phenomenon, to fully understand the effect it may cause for individuals in everyday life, that will be the main focus throughout this assignment.

Early experiments in relation to change blindness trace back to the 1970s, (Neisser & Becklen, 1975) a German American psychologist Ulric Neisser joined by psychologist Robert Becklen, created an experiment after gaining acknowledgement to the phenomenon; they had the idea to test the abilities of attention by placing two activity-based videos over each other, submerging them, then asking all participants to focus on just one of the activities presented. Video one was that of a basketball game, video two was that of a hand slapping game; the way the experiment worked was to test for the inattention blindness, having the participants focus on video one, while an unexpected event occurred in video two and record how many of the volunteers noticed. While asking the participants to notice how many times the ball was passed around in video one, the hand slapping game in video two turned into a different video of individuals shaking hands. (Neisser & Becklen, 1975) Not many of the participants noticed this change, allowing for informative results, that our attention span may be limited. 'An unexpected, yet highly visually conspicuous, event, occurring about halfway through the one-minute game sequence, was noticed by only 18 of 85 subjects.' (Becklen & Cervone, 1983). This experiment paved the way to the phenomenon that is change blindness and that this inability to notice such a drastic change could possibly be affecting society in important parts of their life, yet the history of this topic is solely based in Laboratory settings, thus limiting our reliable sources of intelligence to this field in association to real world settings.

Theoretical assumptions have increased in volume in recent years, with many trying to explain why the inability may occur; a group of psychologists, Carina Kreitz, Daniel Memmert, Daniel J. Simons, Philip Furley published a journal, (Kreitz et al., 2015), presenting a hypothesis that different tasks might use different cognitions of the brain, thus explaining attention abilities to notice a change. 'We hypothesized that noticing in central tasks might be driven by the availability of cognitive resources like working memory, and that noticing in spatial tasks might be driven by the limits on spatial attention like attention breadth.' (Kreitz et al., 2015). While some psychologists may create hypothesis' in relation to subjects, the group of individuals also carried out two different studies, presenting empirical research beneficial to helping understand the occurrence in more detail. Focusing on Study one, this was carried out with the hypothesis in mind, methodically they made

sure to have approval from the ethical committee in relation to their experiments, 'studies were reviewed and approved by the ethics committee of the German Sport University Cologne.' (Kreitz et al., 2015). Participants were recruited with the offer of thirteen euros, in request to take part and to have normal or corrected vision; presenting them also with a written consent slip. The participants were a mixture of men and women, with the total recorded at one hundred and twenty-three participants, although as there were a few complications in relation to their volunteers, the results recorded after said experiments were gathered from just one hundred and sixteen, sixty of which were placed at the near view position and fifty-six placed at the far view position. Participants taking part were asked to complete a rather large number of tasks, eight to be exact, testing for said inability; for example, three working memory tasks, as well as two attention span tasks. After the last questionnaire had been completed by all attendees, the results indicated a high level of cognitive errors in their everyday life. 'High scores in this questionnaire indicate a higher tendency to cognitive failures in daily life.' (Kreitz et al., 2015). The question of whether the results from this experiment are reliable or not comes into play because as stated, during the experiment there were complication, thus leading to valuable data not being possible to record; without the missing data, the possibility as to which the results correct is debatable. 'Due to technical errors, data were missing for some participants in some tasks' (Kreitz et al., 2015). Although, disregarding the possibility that the results may be unreliable, their hypothesis for the experiment was to locate the inability reasons and the method of which they had tested the participants minds, highlighted a distinct affect that the phenomenon has on people everyday lives, thus helping us to understand why it may be happening. This group of psychologists trying to pinpoint where the errors may be occurring may in turn lead us to solving how, thus potentially being able to prevent such a phenomenon in certain circumstantial events.

Previous research in relation to change blindness has seemed to be following a similar pattern, between the settings in which the experiments take place and in turn the variables involved in said experiments; through more research, it becomes clear that the use of two-dimensional shaped pictures for example, and laboratory settings, does not explain how this phenomenon has affected society in real world settings. 'Reject the possibility that change blindness in previous studies resulted from passive viewing of 2-D displays.' (Simons & Levin, 1998). 'It is extremely simple to illustrate the change blindness phenomena by continually showing two images.' (Rensink et al., 1997). Real world everyday settings would include activities that are contained in individual's routines, such as shopping, the gym, cooking; but primarily we will be focusing on an important and complex activity such as driving. According to a Psychologist Adam Galpin, he stated that seeing but failing to actually see what is there is one of the main perceptual mistakes that causes accidents on the road. Although this has previously been explained by attentional or temporal gaps, current change blindness work offers an additional explanation. 'Participants find it very difficult to detect a difference between two subsequent photographs if the transients that ordinarily draw attention are covered up.' (Galpin et al., 2009). This is because humans have a weak recall for the visual environment. Blinking and saccadic suppression can naturally cause this masking to happen, it has been suggested that these consequences might increase accidents. 'Across saccades, blinks, blank screens, movie cuts, and other interruptions, observers fail to detect substantial changes to the visual details of objects and scenes.' (Simons, 2000). In relation to Galpin's theory, another Psychologists interested to research their field was that of David Crundall, with regards to hands on experience or years of experience (Crundall et al., 1999), stated whether more experienced drivers have a wider peripheral vision than less experienced drivers are a matter of concern. His study tried to differentiate between drivers with different driving experiences based on their functional fields of vision. Participants responded to peripheral target lights while searching video clips obtained from a

moving driver's perspective for potential dangers and based on the conclusion from his study, he concluded that; a learning effect was discovered. Which might mean this experiment had discovered a perceptual ability or technique that improves with driving experience. All participant used in the experimental groups saw a decline in hit rates for peripheral targets when processing demands rose, for example, hazards occurred, and as the target's eccentricity increased, albeit there was no interaction. (Crundall et al., 1999), perhaps suggesting less experienced drivers are more inclined to experience change blindness at the happenstances of less driving experience behind them. Gathering from both psychologist's research, it seems to suggest change blindness is something easily experienced in a new environment, 'Other studies discovered that these effects are even stronger when the changes are unexpected.' (Simons & Rensink, 2005). Subsequently, it is more possible to avoid the phenomenon that is inattention blindness when you are aware of what to look out for in real world experiences such as driving a vehicle. 'As compared to the conclusion from (Galpin et al., 2009) that the findings unequivocally show that change blindness may be applied to driving cues.' (Gunnell et al., 2019).

The concept of change blindness in relation to real world settings really is dependent on the individual experiencing it, the human mind is extremely different for everyone. The brain is made up of several parts, an intellectual organ that regulates our body's cognition, retrieval of memory, emotional conductor, motor functions, vision ability. Each of these parts plays a specific role with it comes to individual perception, exposure, environment etc. These factors influence decision making, thoughts patterns, perspectives, social interaction and memories. All of which have a part to play in relation to change blindness, all the different part of the brain not acting as they should can inspire a completely different outcome on this subject, For instance, the Frontal lobe is responsible for intellectual abilities, such as concentration; the Occipital lobe to analyse visual input; Hippocampus involved with retrieving and learning new memories; Cerebellum is responsible for the movement coordination around the body, including eye movement; V1 and V2 in relation to initial visual processing, V3 and V3A for form processing, V4 for colour processing, V5/MT for motion processing. Once listed out, the ability to explore the brain and its full process of experiencing life becomes clearer that change blindness is more complex than many may realise, it may be caused by any number of the brain's process being inactive, possibly responsible by an environmental stimulus at play; though previous research has become empirical to our current knowledge today, it is yet to fully explain the phenomenon; but it does create a stepping stone for future psychologists to reveal the subject in depth. 'The surprising extent of change blindness explains its broad appeal.' (Simons & Rensink, 2005).

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