

The Mere Exposure Effect on University Students

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1. Abstract

This report is a scientific study with a main purpose of investigating *mere exposure* in Swedish university students, if some stimuli are stronger than other, visual or auditory, and bringing awareness to the effects of it. Mere exposure is the psychological phenomena of how we subconsciously develop a preference for something we are exposed to. This is being highly used by companies in marketing and is visible in ads on social media and in person. A quantitative online survey was used with four separate surveys. The survey contained a short video containing certain stimuli (visual, auditory, visual & auditory or no exposure to stimuli). The results did not show any significance regarding university students being affected by the mere exposure effect, however the results indicate a vague trend regarding preference in flavor after exposure to stimuli. The lack of findings can be explained by the sample group being too small. In conclusion, more research is needed to grant understanding regarding the phenomena in students, since the project lacked generalizability due to its small sample size and also being affected by selection bias in the choice of participants from different universities in Sweden.

2. Introduction

This project focuses on the *mere exposure* effect, the phenomenon that a preference for a stimuli is developed with continuous exposure. The effect is a psychological phenomenon over how human beings prefer certain people or objects simply because of familiarity or a repeated exposure to it more frequently than other things. A made discovery is that the effect is used and found in various areas, such as advertising, movies and day-to-day life. Previous courses introduced the subject and a realization occurred that this had affected the group members unconsciously in the past. The subject provides a broad field where a variety of experiments can be performed. By the subject being psychological, more specifically focused on social psychology, the research and information retrieval process needed to be extensive.

3. Background and previous research

3.1 The Affective model & Processing fluency model

The phenomenon was introduced in 1968 by Zajonc and the affective model he provided. The model primarily explained how individuals develop a feeling of uncertainty when shown a novel and unknown

stimuli. An expanded proposition based on Zajonc's previous findings, was made by Jacoby and colleagues, with the notion that being exposed repeatedly to a stimulus increases the processing or fluency of it (1987 ; 1992). The outcome from the motion concluded that the processing part of the exposure occurred subconsciously and therefore without cognitive processing. This specific model over the mere exposure effect explains how participants can develop a preference over time through various subconscious processing and across platforms, which is compatible with the present study.

3.2 Neurological implications

Neurologically, brain activity when exposed to stimuli occurs in multiple regions. The parietal and occipital lobe increases in activity when exposed to visual stimuli (Medical News Today, 2020). The auditory familiarity uses semantic processes involved in memory, in combination with neural activity in the temporal lobe (Purves et al., 2012). One finding that showed relevance to the present study was how being exposed to familiar stimuli increases the activity in the zygomatic muscle, located in one's cheek, in comparison to unfamiliar exposure. The zygomatic muscles react when exposed to familiar stimuli by being activated by impulses sent from the brain regions. When activated, the zygomatic muscles can cause contractions in the cheek, making a person smile. With this, the exposure to familiar stimuli can classify as more appealing and engaging.

3.3 The mere exposure effect in advertising

Heath (2004) explains that certain forms of advertising can create long-lasting brand associations and emotional connections, even when not consciously remembering the related advertisement. When choosing products as a consumer it is done without the recollections of the specific ad in addition to denying the influence the advertisement may have had on their decision. The mere exposure effect is believed to confide in automatic processes that affects liking and preference, as the brain evaluates stimuli through scans before attending to them consciously (Grimes & Kitchen, 2007; Greenwald & Leavitt, 1984). The implicit memory has a great role in the explanation of the phenomenon in regards to consumerism and advertising. Shapiro & Krishnan (2001) suggests that consumers do not actively search in their memory for past information when making decisions revolving purchase. Implicit memory retrieval plays a more

significant role based on its occurrence without conscious effort. Exploring implicit memory provides more valuable insights into consumer behavior as it confides in the behavioral tendencies in comparison to explicit memory referring to consciously remembering something (Krishnan & Chakravati, 1999).

3.4 Importance of our present study

The mere exposure effect creates biases to certain brands or products in consumers, which happens subconsciously. Prejudice and bias towards a brand, object, group or similar aspects can propose a threat in some areas. One aspect where the exposure effect could be potentially dangerous is in politics where the opinions of individuals could easily be influenced by the different marketing techniques. The present study shows the importance of how the mere exposure effect can affect aspects of life unconsciously and therefore why it is important to keep spreading knowledge and increase awareness. By introducing the phenomenon to university students and spreading information of the role it has in making decisions, the goal is to increase awareness within consumers.

4. Purpose and research question

Studying the mere exposure effect and its impacts on individuals, it was decided to focus on Swedish university students. By being part of the target group and being affected by the phenomenon, it seemed only fit to target university students to increase their awareness. The purpose of the project was to spread knowledge of the mere exposure and the effects that may follow. By informing more people about the phenomenon, people will gain more control over the decisions they make by being aware of the existing marketing techniques. More knowledge would with confidence decrease the subconscious decisions that get made through the mere exposure effect. The research question came to be the following: *Is there a difference in the effects of visual and auditory stimuli regarding 'the mere exposure effect' on Swedish university students and can this show the connection between familiarity and liking through subconscious processing?*

5. Hypothesis

Previous studies showed that visual stimuli had a greater impact than auditory (Montoya et al., 2017), hence, it was expected that this project would follow the same direction and the videos with visual stimuli would have more influence than the auditory. Additionally, it was expected that the participants watching the video with no stimuli would not have a certain opinion regarding the product, since they were not exposed. Participants may already have been

affected by the mere exposure effect prior to the test, which could potentially affect the results if they were already biased towards a product. This implies that the results from more videos than one would be beneficial to get better results (Montoya et al., 2017). However, there is no formula of how much exposure that is needed to be able to measure the mere exposure effect on an individual, meaning that it is difficult to make conclusions solely based on a report like this.

The mere exposure effect appears to have a big impact on individuals' liking for a certain stimuli based on how familiar they are with it. Familiarity and preference are effects of the subconscious processing which leads to an expectation that the preference for items that they are familiar with will be of higher degree. There is an expected difference regarding the processing done subconsciously of familiar products, having individuals showing a preference as a result of exposure beyond the boundaries of this study.

Since the foremost ambition of this study is to bring awareness to how the mere exposure effect can affect students, the following applies: *If the project aligns with the hypotheses stated and a significant distinction in opinions can be shown after being exposed to the mere exposure videos, the students in this experiment are supposable being affected by similar input in their daily lives as well.* By spreading awareness of this way of discreet marketing, the freedom of the students and their opinions concerning purchase patterns will increase.

6. Method

6.1 Project method

The study consisted of a quantitative online survey method where participants were to watch a short video in addition to answer questions. For the project, four separate surveys were constructed with the same 32 questions included. The sole difference between the surveys was the video that initiated the questionnaire. Four videos, with the same structure and format, were made to use in the surveys. The videos included different stimuli, very subtly, in order to see whether participants were affected by the stimuli in the video. The videos included the following stimuli: *1. visual & auditory exposure combined, 2. visual exposure, 3. auditory exposure and 4. no exposure to testing stimuli.* In the videos the object in focus was a bottle of sparkling water from the brand *Loka*. By having participants answer the same questions regardless of which video they watched, it would be easy to see when analyzing the results if any stimuli had a greater influence than others.

The mere exposure effect is a phenomenon that has its impact unconsciously, so the questions in the surveys did not reveal what the video or the project's intention was in order to get valid results. It was decided to include questions that were irrelevant to the study to ensure that the participants did not know what they were supposed to answer, and instead answer based on the video content.

In advance to the participants watching the video, they were to read and agree to a formally constructed consent form. The consent form included relevant information concerning the study as well as information as to how their answers would be used in regards to the project. It was also stated that the participants could withdraw their participation at any time during the study to ensure the ethics and relation between participant and researcher.

6.2 Participants and sample

For the study, the aim was to receive a minimum of 40 participants. Ultimately this was not achieved and only 38 responses were gathered for the surveys. From the 38 participants, 19 of them identified as women and 19 identified as men, meaning that the gender distribution came to be equally divided. The participants were gathered through us, the creators of the study. Since being university students ourselves and having the target group to be university students as well it seemed apt to reach out to individuals in vicinity to the group members of the project, to ensure that responses were received in time. It was taken into account that the participants were not chosen randomly which could affect the results in the end. However, it was decided to prioritize gathering a certain amount of respondents to get enough data to analyze.

6.3 Analysis method

The responses to this questionnaire were analyzed by using the software Jamovi (Jamovi, 2022). Various diagrams were used in order to, in a clear and structured way, show the results from the four surveys. Jamovi, as a software, provides the opportunities to analyze data in multiple ways as well as compare them to each other. The object in the videos was a Loka-bottle, which will be referred to further in this report. The variables used were as following: *Group affiliation (Group (general) and group (specific)), Age, Gender, Loka (1-10), Imsdal (1-10), Bonaqua (1-10), Ramlösa (1-10), Aqua d'Or (1-10), Most likely, Reason for buying, Familiarity, Frequence and Flavor*. From these variables and the connected results, diagrams were formed. Primarily, histograms and bar plots were created with a view over the density. With the plots and diagrams the analysis were shown

visually and displayed in an organized way. During the analysis, independent t-tests were produced to evaluate the results significance. Lastly, in the analysis, the Shapiro-Wilk W value and the Shapiro-Wilk p value were inspected in combination with the standard deviation. Only questions from the survey that held a relevance in regards to the project's purpose were analyzed.

6.4 Ethics

For the study, an ethical view was discussed and seen throughout. By following four principles when constructing the surveys, the report and the project as a whole, the ethical part has ensured the integrity of the research made. The four principles were: *Reliability, Honesty, Respect and Accountability* and were collected from All European Academies (2017). Primarily, to ensure integrity and ethics, a consent form was presented to all participants. The participants were to read and agree to the information in the consent form in order to participate in the study. By explaining what the study is about and presenting all relevant material to the participants the ethical part is guaranteed in regards to the relation between participants and researchers.

7. Result

Diagram 1-6 presented the visual likelihood of buying different brands of water between the test group and the control group. Diagrams 1-3 presented the likelihood of buying a certain brand with no significant visual difference. Diagram 7 presented the preferred flavor of sparkling water compared between the test group and control group which visually showed that 'Pear' was preferred. Diagram 8 presented the familiarity of the waterbrands between the test and control group, in which the test group was most familiar with Loka. Diagram 9 presented the reason for buying a brand, in which the 'familiarity' and 'taste' alternative were most noticeable. Diagram 10 presented the brand that the participants were most likely to buy where the majority of the test group (exposed to stimuli) chose Loka. Diagram 11 presented a density comparing likelihood of buying Loka between the four survey answers with no significant visual distinction. The diagram did not show any visual significance but did show that the data is not normally distributed. Diagram 12 was of the density comparing likelihood of buying other brands than Loka and did not hold any significant visual difference between the four groups.

The Shapiro-Wilk W for diagrams 1-6 was for group 1: 0.935 (Imsdal), 0.923 (Bonaqua), 0.914 (Ramlösa), 0.902 (Aqua d'Or), 0.940 (Loka), 0.942

(Not Loka). For group 2 the Shapiro-Wilk W was: 0.882 (Imsdal), 0.933 (Bonaqua), 0.842 (Ramlösa), 0.882 (Aqua d'Or), 0.813 (Loka), 0.899 (Not Loka). The Shapiro-Wilk p for group 1 was: 0.094 (Imsdal), 0.046 (Bonaqua), 0.028 (Ramlösa), 0.015 (Aqua d'Or), 0.121 (Loka), $< .001$ (Not Loka). The Shapiro-Wilk p for group 2 was: 0.111 (Imsdal), 0.444 (Bonaqua), 0.333 (Ramlösa), 0.110 (Aqua d'Or), 0.014 (Loka), 0.001 (Not Loka).

8. Discussion

When comparing the histograms in the Group (general) it showed that the differences between the general groups of each specific brand of water was small, shown in diagrams 1-6. In diagram 1-3 the density represented similar density patterns across brands and general groups. Diagrams 1-8 represented brands that the participants were the least familiar with and least likely to purchase. In diagram 9 it is visible that participants are more likely to purchase a specific brand based on how familiar they are with the brand. With that said, the lower likelihood of purchase observed in diagrams 1-3 can be attributed to the participants' unfamiliarity with those brands.

The results from the study did not reach any significance in many of the diagrams, however in diagram 7 it was visible that there may be a correlation between exposure to stimuli and the chosen flavor of the object. The test group showed a preferred taste of Pear while the control group preferred Citrus. Regardless, the control group is significantly smaller than the test group which further makes it difficult to establish a clear correlation.

9. Final debate and conclusion

There is no doubt that mere exposure affects the everyday life of a student based on previous research, however in this study with the low number of participants and them not being properly randomized it was not possible to make any big discoveries. To receive a better understanding of the mere exposure effect on university students in Sweden, from a consumer perspective, further research is needed. The results shown in this project need more participants to be significant. A similar project with a bigger sample, availability to resources and a broader time frame would grant more reliable results and would thus be optimal for a deeper understanding of the mere exposure effect. Ideally the results of both this survey and the improved version should be discussed in forums of universities to fulfill the goal of more freedom in the decision making and consumption patterns in the life of a student. To conclude, the results did not show any significance that the mere

exposure effect has affected the participants. This is guessed to be affected by the limitations noticeable in the project. One interesting aspect however, is that the results vaguely show a slight preference in flavor after the exposure to stimuli. Whether this is caused by the stimuli or a general finding is unknown but the main outcome is that more research is needed about the mere exposure effect in order to spread knowledge.

10. References

- Alter, A. L., & Oppenheimer, D. M. (2009). Uniting the Tribes of Fluency to Form a Metacognitive Nation. *Personality and Social Psychology Review*, 13(3), 219–235. <https://doi.org/10.1177/1088868309341564>
- All European Academies. (2017). The European Code of Conduct for Research Integrity. All European Academies. (Revised Edition). <https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf>
- Bacon-Shone, J. (2013). Introduction to Quantitative Research Methods. Graduate School, The University of Hong Kong. 45-47. ISBN: 978-988-12813-0-2
- Berlyne, D. E. (1970). Novelty, complexity, and hedonic value. *Attention Perception & Psychophysics*, 8(5), 279–286. <https://doi.org/10.3758/bf03212593>
- Bornstein, R. F. (1989). Exposure and affect: Overview and meta-analysis of research, 1968–1987. *Psychological Bulletin*, 106(2), 265–289. <https://doi.org/10.1037/0033-2909.106.2.265>
- Bornstein, R. F., & D'Agostino, P. M. (1992). Stimulus recognition and the mere exposure effect. *Journal of Personality and Social Psychology*, 63(4), 545–552. <https://doi.org/10.1037/0022-3514.63.4.545>
- Bornstein, R. F., & D'Agostino, P. M. (1994). The Attribution and Discounting of Perceptual Fluency: Preliminary Tests of a Perceptual Fluency/Attributional Model of the Mere Exposure Effect. *Social Cognition*, 12(2), 103–128. <https://doi.org/10.1521/soco.1994.12.2.103>
- Crandall, J. E. (1970). Preference and Expectancy Arousal: Further Evidence. *Journal of General Psychology*, 83(2), 267–268. <https://doi.org/10.1080/00221309.1970.9710809>
- DiFranza, J. R., Wellman, R. J., Sargent, J. D., Weitzman, M., Hipple, B., & Winickoff, J. P. (2006). Tobacco Promotion and the Initiation of Tobacco

- Use: Assessing the Evidence for Causality. *Pediatrics*, 117(6), e1237–e1248. <https://doi.org/10.1542/peds.2005-1817>
- Dwivedi, Y. K., Kapoor, K. K., & Chen, H. (2015). Social media marketing and advertising. *The Marketing Review*, 15(3), 289–309. <https://doi.org/10.1362/146934715x14441363377999>
- Freitas C, Manzato E, Burini A, Taylor MJ, Lerch JP and Anagnostou E (2018) Neural Correlates of Familiarity in Music Listening: A Systematic Review and a Neuroimaging Meta-Analysis. *Front. Neurosci.* 12:686. <https://doi.org/10.3389/fnins.2018.00686>
- Frost, J. (2022, November 10). Independent samples t test: Definition, using & interpreting. *Statistics By Jim*. <https://statisticsbyjim.com/hypothesis-testing/independent-samples-t-test/>
- Greenwald, A. G., & Leavitt, C. (1984). Audience Involvement in Advertising: Four Levels. *Journal of Consumer Research*, 11(1), 581. <https://doi.org/10.1086/208994>
- Grimes, A., & Kitchen, P. J. (2007). Researching Mere Exposure Effects to Advertising - Theoretical Foundations and Methodological Implications. *International Journal of Market Research*, 49(2), 191–219. <https://doi.org/10.1177/147078530704900205>
- Harmon-Jones, E. (1995). *The mere exposure effect and emotion: A psychophysiological investigation*. Arizona: The University of Arizona.
- Heath, R. W., & Nairn, A. (2005). Measuring Affective Advertising: Implications of Low Attention Processing on Recall. *Journal of Advertising Research*, 45(02), 269. <https://doi.org/10.1017/s0021849905050282>
- Heale, R., Twycross, A. (2015). Validity and reliability in quantitative studies. *Evid Based Nurs*. 18: 66-67 originally published online May 15, 2015 <https://doi.org/10.1136/eb-2015-102129>
- Hekkert, P., Thurgood, C., & Whitfield, T. W. A. (2013). The mere exposure effect for consumer products as a consequence of existing familiarity and controlled exposure. *Acta Psychologica*, 144(2), 411–417. <https://doi.org/10.1016/j.actpsy.2013.07.015>
- Jacoby, L. L., & Dallas, M. L. (1981). On the relationship between autobiographical memory and perceptual learning. *Journal of Experimental Psychology: General*, 110(3), 306–340. <https://doi.org/10.1037/0096-3445.110.3.306>
- Jacoby, L. L., & Kelley, C. M. (1987). Unconscious Influences of Memory for a Prior Event. *Personality and Social Psychology Bulletin*, 13(3), 314–336. <https://doi.org/10.1177/0146167287133003>
- Jacoby, L. L., Lindsay, D. S., & Toth, J. M. (1992). Unconscious influences revealed: Attention, awareness, and control. *American Psychologist*, 47(6), 802–809. <https://doi.org/10.1037/0003-066x.47.6.802>
- Jacoby, L. L., & Whitehouse, K. (1989). An illusion of memory: False recognition influenced by unconscious perception. *Journal of Experimental Psychology: General*, 118(2), 126–135. <https://doi.org/10.1037/0096-3445.118.2.126>
- Janiszewski, C. (1988). Preconscious Processing Effects: The Independence of Attitude Formation and Conscious Thought. *Journal of Consumer Research*, 15(2), 199. <https://doi.org/10.1086/209157>
- Janiszewski, C. (1993). Preattentive Mere Exposure Effects. *Journal of Consumer Research*, 20(3), 376. <https://doi.org/10.1086/209356>
- Krishnan, H. S., & Chakravarti, D. (1999). Memory Measures for Pretesting Advertisements: An Integrative Conceptual Framework and a Diagnostic Template. *Journal of Consumer Psychology*, 8(1), 1–37. https://doi.org/10.1207/s15327663jcp0801_01
- Kunst-Wilson, W., & Zajonc, R. B. (1980). Affective Discrimination of Stimuli That Cannot Be Recognized. *Science*, 207(4430), 557–558. <https://doi.org/10.1126/science.7352271>
- Lodish L.M., Magid A., Kalmenson S., Livelsberger J., & Lubetkin B. (1995) In: B. Richardson & M.E. Stevens, How TV advertising works: a meta-analysis of 289 real world split cable TV advertising experiments. *Journal of Marketing Research*, 32 (May), pp. 125–139.
- Mandler, G., & Nakamura, Y. (1987). Aspects of Consciousness. *Personality and Social Psychology Bulletin*. <https://doi.org/10.1177/0146167287133002>
- Martindale, C. (1984). The pleasures of thought: A theory of cognitive hedonics. *Journal of Mind and Behavior*. <https://psycnet.apa.org/record/1985-02765-001>
- Monroe, K. B., & Lee, A. Y. (1999). Remembering versus Knowing: Issues in Buyers' Processing of Price Information. *Journal of the Academy of Marketing Science*, 27(2), 207–225. <https://doi.org/10.1177/0092070399272006>

- Montoya, R. M., Horton, R., Vevea, J. L., Citkowicz, M., & Lauber, E. A. (2017). A re-examination of the mere exposure effect: The influence of repeated exposure on recognition, familiarity, and liking. *Psychological Bulletin*, 143(5), 459–498. <https://doi.org/10.1037/bul0000085>
- Morgenstern, M., Isensee, B., & Hanewinkel, R. (2013). Seeing and Liking Cigarette Advertisements: Is There a ‘Mere Exposure’ Effect? *European Addiction Research*, 19(1), 42–46. <https://doi.org/10.1159/000339836>
- Murphy, S. T., & Zajonc, R. B. (1993). Affect, cognition, and awareness: Affective priming with optimal and suboptimal stimulus exposures. *Journal of Personality and Social Psychology*, 64(5), 723–739. <https://doi.org/10.1037/0022-3514.64.5.723>
- Occipital lobe: Definition, function, and linked conditions. (2020). Retrieved 11 May 2023, from <https://www.medicalnewstoday.com/articles/occipital-lobe>
- Parija, S., & Mandal, J. (2014). Informed consent and research. *Tropical Parasitology*, 4(2), 78. <https://doi.org/10.4103/2229-5070.138533>
- Pohl, R., E. Oswald, M., & Grosjean, S. (2004). 4 Confirmation bias. In *Cognitive illusions: A handbook on Fallacies and biases in thinking, judgment and memory* (pp. 79–95). essay, Routledge. <https://doi.org/10.13140/2.1.2068.0641>
- Purves, D., Cabeza, R., Huettel, S. A., LaBar, K. S., Platt, L. M., Woldorff, M. G. (2012). *Principles of Cognitive Science*. (2nd Edition). Sinauer Associates, Inc.
- Richardson-Klavehn, A., & Bjork, R. A. (1988). Measures of Memory. *Annual Review of Psychology*, 39(1), 475–543. <https://doi.org/10.1146/annurev.ps.39.020188.002355>
- Schacter, D. L. (1987). Implicit memory: History and current status. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 13(3), 501–518. <https://doi.org/10.1037/0278-7393.13.3.501>
- Shapiro, S., MacInnis, D. J., & Heckler, S. E. (1997). The Effects of Incidental Ad Exposure on the Formation of Consideration Sets. *Journal of Consumer Research*, 24(1), 94–104. <https://doi.org/10.1086/209496>
- Shapiro, S., & Krishnan, H. S. (2001). Memory-Based Measures for Assessing Advertising Effects: A Comparison of Explicit and Implicit Memory Effects. *Journal of Advertising*, 30(3), 1–13. <http://www.jstor.org/stable/4189184>
- Shanker Krishnan and Carol Pluzinski (1993) ,"Brand Name Memory Following Ad Exposure: Inhibition, Interference and Attenuation Processes As Revealed By Direct and Indirect Tests of Memory", in *NA - Advances in Consumer Research Volume 20*, eds. Leigh McAlister and Michael L. Rothschild, Provo, UT : Association for Consumer Research, Pages: 655.
- Stacy, A. W., & Wiers, R. W. (2010). Implicit Cognition and Addiction: A Tool for Explaining Paradoxical Behavior. *Annual Review of Clinical Psychology*, 6(1), 551–575. <https://doi.org/10.1146/annurev.clinpsy.121208.131444>
- Tripepi, G., Jager, K. J., Dekker, F. W., & Zoccali, C. (2010). Selection bias and information bias in clinical research. *Nephron Clinical Practice*, 115(2), c94–c99. <https://doi.org/10.1159/000312871>
- Tops, M., Huffmeijer, R., Linting, M., Grewen, K. M., Light, K. C., Koole, S. L., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2013). The role of oxytocin in familiarization-habituation responses to social novelty. *Frontiers in psychology*, 4, 761. <https://doi.org/10.3389/fpsyg.2013.00761>
- The jamovi project (2022). jamovi (Version 2.3) [Computer Software]. Retrieved from <https://www.jamovi.org>
- Tulving, E., Schacter, D. L., & Stark, H. A. (1982). Priming effects in word-fragment completion are independent of recognition memory. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 8(4), 336–342. <https://doi.org/10.1037/0278-7393.8.4.336>
- Whittlesea, B. W. A., Jacoby, L. L., & Girard, K. (1990). Illusions of immediate memory: Evidence of an attributional basis for feelings of familiarity and perceptual quality. *Journal of Memory and Language*, 29(6), 716–732. [https://doi.org/10.1016/0749-596x\(90\)90045-2](https://doi.org/10.1016/0749-596x(90)90045-2)
- Wixted, J. T., & Mickes, L. (2010). A continuous dual-process model of remember/know judgments. *Psychological Review*, 117(4), 1025–1054. <https://doi.org/10.1037/a0020874>
- Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, 9(2, Pt.2), 1–27. <https://doi.org/10.1037/h0025848>