

Decoding the Name-Recall Conundrum a Novel Perspective on Cognitive Processing and Enhancement Strategies

Leonard Bernau, Science 21 Foundation, Czech Republic
Tomáš Benka, Science 21 Foundation, Czech Republic

The Asian Conference on Psychology & the Behavioral Sciences 2024
Official Conference Proceedings

Abstract

This paper investigates the prevalent issue of forgetting names immediately after introductions, a problem evidenced by an 89% failure rate among a sample size of 458 individuals. We propose that the root cause of this memory lapse is not an inherent issue with memory retention or retrieval. Instead, it relates to a specific cognitive phenomenon whereby the verbal information (the name) triggers an internal visualization of a previously known individual associated with that name. This internal image, superimposed upon the visual perception of the newly introduced person, creates a disconnect between the verbal and visual components, leading to a lack of memorization. We argue that this isn't a memory failure, but an information classification issue. Initial experiments indicate that making individuals aware of the internal visual component upon introduction and training them with a technique described in this paper can effectively facilitate name recall. Our findings shed light on this overlooked cognitive phenomenon and introduce new prospects for cognitive enhancement and education beyond memory skills.

Keywords: Cognitive Processes, Name Recall, Memory Retention, Visual Association, Cognitive Mental Processes, Memory Cognitive Phenomena, Cognitive Augmentation, Model of Cognitive Process

iafor

The International Academic Forum
www.iafor.org

Introduction

Building on the new concept of perception, which aims to understand the Cognitive Process (CP) of consciousness through the mathematical model (Petty, R. E., & Briñol, P., 2015), this paper extends our investigation to everyday cognitive challenges, such as the frequent inability to remember names upon introductions. This framework provides a foundation for examining why an 89% failure rate in name recall among a sample of 458 individuals is not merely a memory glitch but relates to deeper cognitive processing issues. Although not extensively covered before, this specific phenomenon is thoroughly described within the current sections of this article.

The phenomenon of individuals forgetting names almost immediately after introductions can be understood through the lens of cognitive resonance. This issue arises not from a failure in memory retention or retrieval per se but from a complex interaction between verbal and visual cognitive processes. When a name is heard, it evokes an internal visualization of another individual previously associated with it. This visualization then overlays the visual perception of the person being introduced, causing a cognitive disconnect that impedes the association needed for memory recall.

As discussed in subsequent sections of this paper, this is not just a lapse in memory but a misclassification of information within the cognitive system. Preliminary experiments, detailed later, have shown that by making individuals consciously aware of this internal visualization process at the moment of introduction and employing a specific training technique, we can significantly improve the recall of names. This insight advances our understanding of cognitive phenomena. It opens new pathways for enhancing cognitive functions in educational and professional settings, moving beyond traditional memory training techniques to embrace a broader spectrum of cognitive skills.

Novel Concept of Continuum Perception

Based on a broad multidisciplinary synthesis (Robbins, B. G., 2016), we introduce a new theoretical concept of the Configuration Space (CS) to describe the human Cognitive Process (CP), by which we can assign a unique "dynamic address" to any complex situation and further process it like how the human observer on an unconscious level (intuitively) works with reality; the Electronic equivalent of consciousness with elementary mental process model (EEC) (Bernau, L., Paulu, F., & Voves, J., 2020).

Stratification of Cognitive Process (CP) and Cognitive Resonance

To describe and partially design a complex structure as the human CP, it is necessary to operate in specific artificially established system levels (layers) even though the real CP works with all layers simultaneously. In the following description, we first follow the process in which the input visual signal (V) from the external environment constructively interferes with the verbal-acoustic signal (VeA) from the basic image matrix (BIM_V) to the third order Abstract Process (AP_{III}) (Bai, M., Ih, J.-G., & Benesty, J., 2013). The VeA signal is supplemented into the system by the observer's Neural Networks (NN), as they have been taught to the given visual signals. Subsequently, we describe CP from the opposite side, where the verbal-acoustic signal (VeA) comes into the system from the external environment (words and sentences). The NN complements the learned visual signal (V) with which they constructively interfere. The synthesis of both simultaneous processes in the human CP is

called Cognitive Resonance CR in this model. The CR process can be imagined effectively by realizing that any visual perception (object, situation) always belongs to NN's specific verbal formulation. Thus, when looking at any object, the incoming visual signal is recognized by hearing the "inner voice" in the background, by which the NNs name this object. Vice versa, after hearing a word, a sentence, or a characteristic sound (for example, a passing vehicle), NN projects their Learned Optical Visualization (LOV) in the mental space. The CR can be amplified by concentrating on the incoming visual signal (V) or closing the eyes after hearing the incoming acoustic signal (VeA). Under standard conditions, each observer projects an internal LOV image generated by NN through the image coming from the optical receptors (V). The NN's image (which is the transformation of VeA) is significantly weaker and constructively interferes with the external environment's image. This causes some parts of the V in the BIM_V to amplify. The explanation process is based on this principle.

Illustrative Situation

The CP mechanism is inherently universal, which defines the mathematical description of CP. However, for better understanding and clarity, we will use a model involving introducing two individuals, Maria and Peter, where Peter is the observer. The model is described from Peter's perspective, thus detailing the algorithm for remembering the name Maria. To clarify the first levels of the CP, it is necessary to initially work with the idea that all moving objects are "frozen in time." At the lowest level of CP, the external visual signal of the overall situation falls as a 2D image on the observer's retina. We define this "raw" signal (V) as the basic image matrix BIM_V , formula 1.

$$BIM_V = \begin{bmatrix} a_{11} & \dots & a_{1n_a} \\ \vdots & \ddots & \\ a_{m_a 1} & & a_{m_a n_a} \end{bmatrix} \quad (1)$$

Each point the frequency and amplitude of individual pixels of the incoming V defines a . In the ideal center of BIM_V we further determine its central coordinate, the point Q_{out} . Every time observer changes the position of eyes, head, body or starts to move, a new center coordinate Q_{out} is set for BIM_V and all points a in BIM_V correspond to the resulting movement, Figure 1.

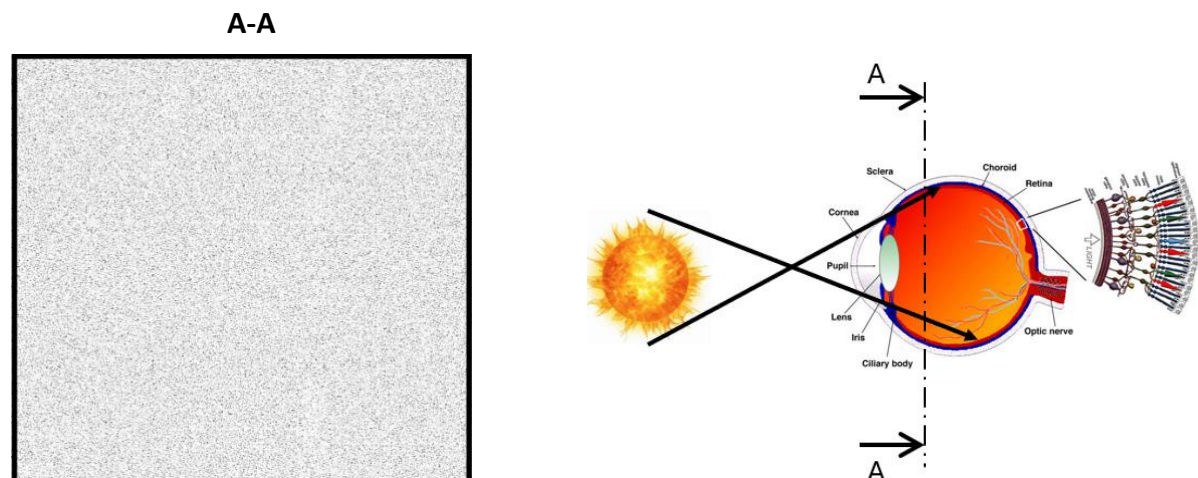


Figure 1: (left) Empty observer's basic image matrix BIM_V . (right) Illustration of the retina in the eye with incoming light (Kolb, H., 1991).

its background located in the corresponding rectangle V_{comp} . In the center of a partial matrix, i.e., in each rectangle's center, we define the center coordinate Q_{in} . For each change in the observer's movement (change in the position of his head or eyes), a new value of the center coordinate Q_{in} is set for each V_{comp} . In the next level of CP,⁴ which is called the Space Perception Matrix (SPM), all V_{comp_n} for each specific VeA^I , are compared with a learned reference value of their average size or more precisely, average area of their V_{comp_n} by

$$P_n = \frac{(x_{e_n} - x_{i_n})(y_{e_n} - y_{i_n})}{S_{ref_t}}, \quad (5)$$

where P_n is the ratio of the area of V_{comp_n} to the learned reference area S_{ref_t} , where t is a type of a component directly belonging to a specific VeA_t^I (Maria).

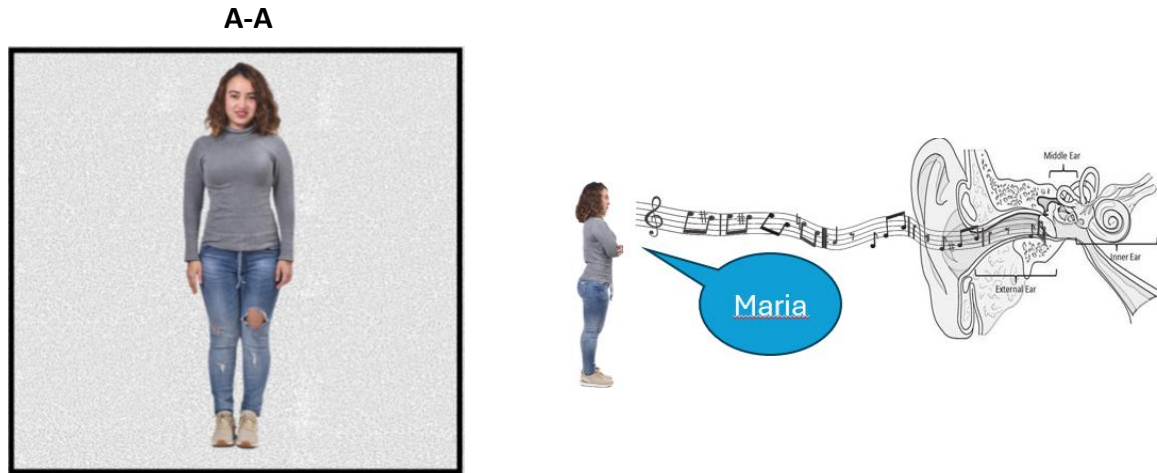


Figure 3: (left) Observer's basic image matrix BIM_V where the visual components V_{comp_n} constructively interfered with VeA Maria from the ear. (right) Illustration of the sound sensation (Polyak, SL., 1941).

By this mechanism, due to the different sizes of the same objects (or more precisely the area of their V_{comp}) and due to their comparison with learned reference size S_{ref_t} , perception of space is created in this CP level for the first time, (The observer does not know another Maria). It should be emphasized that in this level of the CP model, all objects are static. Furthermore, the spatial perception is created only by the synthesis of a 2D image, not by binocular stereoscopic vision (Blake, R., & Wilson, H., 2011, Vishwanath, D., & Hibbard, P. B., 2013). The perception of space is created by the observer's neural networks assigning VeA "closer" to larger objects (larger than their mean reference size) and VeA "further" to smaller objects. Since the perception of space arises in one of the lowest levels of CP, it is fundamentally inherent. Therefore, it is very difficult to imagine space as a 2D scheme with differently sized V_{comp_n} , even in a photography. It requires a special, high-performance CP and individuals with this ability are usually, without realizing it, talented painters or architects. Multiple V_{comp} (more trees in BIM_V) to which the observer can assign the VeA "closer" or "further" are called spatial reference objects (SRO). In a specific situation SROs do not have their usual size (some people are unusually large/small).

For other levels of CP, the static restriction where all objects are as if "frozen in time" is no longer valid. This restriction was introduced to better understand the basic levels of CP. However, no static phenomenon occurs in CP. In all levels of CP, starting with the BIM_V there is a movement of all its components through the observer's consciousness in situational

dimensions. This phenomenon is natural for every observer, and therefore its existence under normal conditions is practically impossible to realize.

Returning to the illustrated example of introducing. As the situation progresses, the "record/introducing" of this situation shifts through the observer's consciousness in the situational matrices. The observer himself does not perceive this recording, as is described in the EEC (Bernau, L., Paulu, F., & Voves, J., 2020), but if asked, the observer could imagine the whole situation again or backward and "replay" any part of it for a certain period of time. We hypothesize that short-term memory is an area of the CP in which BIM_V and the respective V_{comp} and their respective VeA^{II} are still fully present ("flowing") in the situational dimension in the consciousness of the observer.

In this level of CP, the individual V_{comp} moves through the consciousness of the observer according to the relationship:

$$M_n = \frac{1}{P_n} \sum_{x=x_{i_n}}^{x_{e_n}} \sum_{y=y_{i_n}}^{y_{e_n}} K_{\Delta} \left(\frac{\delta b_{xy(s)}}{\delta s} \right) , \quad (6)$$

where M_n is a quantity determining the rate of motion of each given V_{comp_n} and $b_{xy(s)}$ is a point (pixel) and a function of variable s , where s is the speed of motion in a situation (time), which we differentiate concerning the situation, where it is true that the more dynamic the change in motion, the higher its value. By this mechanism, the observer amplifies the perception of moving objects beyond their amplification by the principle of self-similarity from $V_{amp_{\epsilon}}$. K_{Δ} is a learned nonlinear function that corrects the derivative so that the gain is effective concerning the rate of change. The distance factor is tack-led by the quantity P_n . If objects move at the same speed, those that are closer are amplified more and vice versa.

The next level of CP called SM is created (7). In this level, the slowed optical signal moves through the consciousness of the observer in a form of "visual flow" in the situational dimension characterized by those mentioned above dynamically changing parameters (U_{S_n} , D_{S_n} , L_{S_n} , R_{S_n} , V_{S_n} , H_{S_n} , M_{S_n} , P_{S_n}) for individual "situational layers" ($S_1, S_2, \dots S_n$):

$$SM_n = \begin{bmatrix} U_{s_1} & U_{s_2} & U_{s_3} & \dots \\ D_{s_1} & D_{s_2} & D_{s_3} & \dots \\ L_{s_1} & L_{s_2} & L_{s_3} & \dots \\ R_{s_1} & R_{s_2} & R_{s_3} & \dots \\ H_{s_1} & H_{s_2} & H_{s_3} & \dots \\ V_{s_1} & V_{s_2} & V_{s_3} & \dots \\ M_{s_1} & M_{s_2} & M_{s_3} & \dots \\ P_{s_1} & P_{s_2} & P_{s_3} & \dots \end{bmatrix} VeA_n^{II} , \quad (7)$$

where SM_n is the SM for V_{comp_n} . Each column represents one "time slice" of a given V_{comp_n} . Its top four values are IN_{form} containing *Up*, *Down*, *Left* and *Right*, two values are OUT_{form} containing *Horizontal* and *Vertical* values according, and the last two values are M_n and P_n of size $V_{comp_{nS_n}}$ (formulas 6 and 7). Each SM has a corresponding VeA^{II} , which describes the situation. For the sake of simplifying comprehension, we have selected the scenario of introducing, which in this case is static and thus not in motion, eliminating the need to further explore SM and VeA^{II} .

First-Order Abstraction Process

The abovementioned model explains the principle of first-order abstract thinking AP_I . The observer (Peter) is looking on the Maria's body. In his consciousness, through the Cognitive Cascade (CC), Figure 4, individual V_{comp_S} with the corresponding VeA^I (Maria) are created from BIM_V . In this level of CP, the NNs of the observer create all the variations of V_{comp} which the NNs have been taught and assign to them the corresponding VeA_n^{III} . Thus, we can imagine the first-order abstract process as a matrix of all variations that the given situation contains and the VeA_n^{III} s belonging to them. Thus, this CP level is a fundamental generator of logical thinking, where all variations of all variants of all V_{comp_S} and their VeA s are equivalent. It can be imagined as an analogy to mathematics, where all the rules in all the expressions' variants are permanently active. Statements corresponding to all variations at the same time simultaneously are considered logical. An equivalent verbal formulation achieves a different number of variations in AP_I by a different observer. The higher logical intensity is achieved by an observer with "richer" variations in AP_I , which then amplify certain partial variations in AP_n . First-order abstraction via VeA_n^{III} amplifies the visual dynamics of those V_{comp} in BIM_V to which the given VeA_n^{III} corresponds, i.e., of all that are included in a given VeA_n^{III} cognitive cascade. The order in which the given V_{comp_S} occur in the respective SM s is of fundamental importance for the AP_I . In the illustrated introducing situation, suppose a given VeA_n^{III} shapes all the Marias that we know, forming their individual visual components (V_{comp_S}) along with VeA^I .

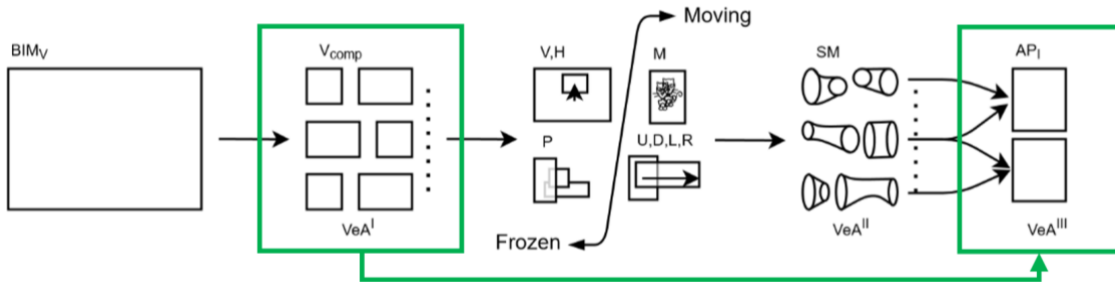


Figure 4: The model of cognitive cascade process summarizes the visual part of the CP, where (from the left side), by amplifying self-similar points in BIM_V an individual visual component provided with VeA^I (verbal formulation of 2D objects) are obtained.

When processed by SPM, spatial perception, IN_{form} and OUT_{form} emerge. By further amplifying the moving points of the SM , individual visual components move through the observer's consciousness as specific spatial objects with the corresponding VeA^{II} are obtained. Subsequently, all their variants are combined into all variations in the AP_I process, where each variation is given a specific VeA^{III} . The green representation is the CP algorithm for memorizing names.

It is possible to describe the illustrated model upon obtaining the necessary foundation of the CC mathematical model. We have understood how an image (Maria) forms on the observer's (Peter's) retina and through which mechanisms the V_{comp} visualization of Maria is created in Peter's consciousness. Therefore, during introductions, the observer (Peter) needs to visualize the introducing person (Maria) with VeA^{III} Maria, paralleling all the Marias he knows, and then update this information (identification of Marias) with AP_I . This represents a fundamental contribution of the CC mathematical model. If a name is not remembered, the observer updates BIM_V , and consequently, association with AP_I is not possible, leading to the

forgetting of the name, Figure 5, as summarized in the statistics presented at the end of this paper.



Figure 5: Observer's basic image matrix BIM_V . The visual components (V_{comp_n}) and verbal audio (VeA_n^{III}) are in conflict, and the first-order abstract (AP_I) has not been updated with the new Maria. As a result, name recall in this instance is either random or improbable.

Audio Signal Processing

However, a more in-depth description and explanation of the acoustic signal processing mechanism (Boashash, B., 2016) and its phenomena is beyond this paper's required capacity and will be described in its continuation. Nevertheless, it is crucial to understand that all processes, i.e., processing V and A and other signals from subsystems (vision (Hickey, C., & Peelen, M. V., 2015), hearing (Sottek, R., & Genuit, K., 2005), smell, touch, heat, cold, pain (Cabibihan, J., Joshi, D., et al., 2015), proprioception (Tuthill, J. C., & Azim, E., 2018), vestibular sensor (Hitier, M., Sato, G., et al. (2016)), interoreceptors (Lazovic, B., Zlatkovic Svenda, et al., 2016) and taste (Ji, M., et al., 2014), take place simultaneously within the CP4 of the observer. Incoming V is processed by synthesis with corresponding VeA according to the above described laws up to the level of highest order abstraction processes, which are not discussed in this article. Simultaneously, the "inversely complementary" process of "deabstractization" of incoming VeA and surrounding A takes place via the synthesis with appropriate visualizations in all variants of all variations back to the BIM_V level. All these processes interfere with each other in the observer's consciousness simultaneously, continuously and, above all, physically. Their resulting super synthesis is in this model the mechanism (principle) of the phenomenon of thinking. This super synthesis can, in turn, be seen as a logical superstructure of individual phylogeny, which has implicitly continued to evolve through communication and cooperative behavior on the social level.

Conclusion

Numerous studies have investigated this issue, utilizing various methodologies. However, a significant challenge arises in their comparison, as none of these studies is founded on a fundamental mathematical model of the cognitive process. Depending on the diverse methods used, name recall after an interaction or over time intervals have been observed to vary between 46.92% and 94.6% (Almond, N., & Morrisonb, C., 2017, Burton, A., Jenkins, R., & Robertson, D., 2018, Popov, et al., 2018, Brédart, S., & Vanootighem, V., 2022). The studies on name recall are based on the publications mentioned (Hamilton, L. J., & Krendl, A. C., 2024, Brédart, S., & Vanootighem, V., 2022), with the methodology and evaluation described

in these studies. Among 458 respondents, the problem of remembering names was demonstrated in 89% of individuals.

In this work, we have delineated a foundational mathematical model of the CP. We further dissected the CC mechanism and applied it to the memory retention of names during introducing. A significant contribution of this study is the innovative approach to cognitive processes of consciousness, which yields effective methodologies beyond just the illustrated example. To eliminate the issue of name, recall at introductions, we visualize the first-order abstract containing all Marias during each introduction. If the Maria in question is unknown, we also visualize all Marias in the first-order abstract (AP_1) using verbal audio (VeA^I) and update it via the visual component (V_{comp_n}), thus refreshing the first-order abstract (VeA^I) with the new Maria. A significant contribution of this study is the creation of new mnemonic tools using the mathematics of this model, not just for names but across various aspects of daily life where memory enhancement is essential.

Suppose this mechanism fails to occur and the name is not remembered. In that case, the issue does not reside within memory itself but in the conscious movement within the mental space of consciousness.

All theoretical assumptions presented here are based on empirical data obtained during 20 years of research in skydiving and aviation (Paraclub Olymp Prague., 2024, April, S. A. S. s.r.o., 2024, April). By applying this research to practical activities, the authors achieve remarkable results. Based on them, a novel model of the human CP is gradually emerging. The new concept of continuum perception results from a multidisciplinary synthesis originally based on extensive research into human behavior in extreme conditions. It brings a whole novel perspective on the human CP. Its fundamental benefit is the implementation of the phenomenon of consciousness as an evolutionary substrate (Mattick, J. S., & Mehler, M. F., 2008) of human intelligence (Hampshire, A., Highfield, et al., 2012). The application of this model to various areas of human mental (Rüsch, N., et al., 2009) and physical performance (Puthuchery, Z., et al., 2011) such as memory (van Gerven, M. A. J., Maris, et al., 2013), concentration (Mahmoudi, B., & Erfanian, A., 2006, Greenlees, I., Thelwell, R., & Holder, T., 2006), emotional stability (Elkins, R. K., Kassenboehmer, S. C., & Schurer, S., 2017), orientation in space (Peer, M., Salomon, R., et al., 2015), reflexes (Horslen, B. C., Dakin, et al., 2014), fast decision-making (Kester, L., Griffin, A., Hultink, E. J., & Lauche, K., 2011), perseverance (Tenenbaum, et al., 2004) brings very convincing results (Clemente-Suárez, V. J., Robles-Pérez, et al., 2017, Mazurek, K., et al., 2018). Equally interesting are the results in the treatment of psychological problems (Dutcher, J. M., & Creswell, J. D., 2018) such as fear of heights (Salassa, J. R., & Zapala, D. A., 2009), fear of flying (Oakes, M., & Bor, R., 2010), learning problems (Benicasco, J., Witnauer, J., & Kopunek, K., 2020) and communication (Adams, C., Lockton, et al., 2012). Very interesting results are in the level of understanding in communications (Kwon, G., Smith-Jackson, T., & Bostian, C., 2011), teamwork and minimizing misunderstandings (Endsley, M. R., 2015) and conflicts.

References

- Adams, C., Lockton, E., Freed, J., Gaile, J., Earl, G., McBean, K., Nash, M., Green, J., Vail, A., & Law, J. (2012). The Social Communication Intervention Project: a randomized controlled trial of the effectiveness of speech and language therapy for school-age children who have pragmatic and social communication problems with or without autism spectrum disorder. *International Journal of Language & Communication Disorders*, 47(3), 233-244.
- Almond, N., & Morrisonb, C. (2017). Effects of aging and recall of common and uncommon first names using the face-name association technique compared with the pure-lists technique over repeated trials.
- Bai, M., Ih, J.-G., & Benesty, J. (2013). *Acoustic array systems: Theory, implementation, and application* (1st ed.). Wiley.
- Benicasco, J., Witnauer, J., & Kopunek, K. (2020). Two blocking cues counteract in human contingency learning. *Learning and Motivation*, 71, 101641.
- Bernau, L., Paulu, F., & Voves, J. (2020). Electronic equivalent of consciousness with elementary mental process model. In L. Iliadis, P. P. Angelov, C. Jayne, & E. Pimenidis (Eds.), *Proceedings of the 21st EANN (Engineering Applications of Neural Networks) 2020 Conference* (pp. 487-496). Springer International Publishing.
- Blake, R., & Wilson, H. (2011). Binocular vision. *Vision Research (Oxford)*, 51(7), 754-770.
- Boashash, B. (2016). *Time-frequency signal analysis and processing: A comprehensive reference* (2nd ed.). Academic Press.
- Brédart, S., & Vanootighem, V. (2022). Middle-aged people's perceptions of name recall failures. *Advances in Cognitive Psychology*, 18(1), 27–32.
- Burton, A., Jenkins, R., & Robertson, D. (2018). I recognise your name but I can't remember your face: An advantage for names in recognition memory. *Quarterly Journal of Experimental Psychology*, 72, 1847 - 1854.
- Cabibihan, J., Joshi, D., Srinivasa, Y. M., Chan, M. A., & Muruganantham, A. (2015). Illusory sense of human touch from a warm and soft artificial hand. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 23(3), 517-527.
- Clemente-Suárez, V. J., Robles-Pérez, J. J., & Fernández-Lucas, J. (2017). Psychophysiological response in parachute jumps, the effect of experience and type of jump. *Physiology & Behavior*, 179, 178-183.
- Dutcher, J. M., & Creswell, J. D. (2018). The role of brain reward pathways in stress resilience and health. *Neuroscience and Biobehavioral Reviews*, 95, 559-567.
- Elkins, R. K., Kassenboehmer, S. C., & Schurer, S. (2017). The stability of personality traits in adolescence and young adulthood. *Journal of Economic Psychology*, 60, 37-52.

- Endsley, M. R. (2015). Situation awareness misconceptions and misunderstandings. *Journal of Cognitive Engineering and Decision Making*, 9(1), 4-32.
- Greenlees, I., Thelwell, R., & Holder, T. (2006). Examining the efficacy of the concentration grid exercise as a concentration enhancement exercise. *Psychology of Sport and Exercise*, 7(1), 29-39.
- Hamilton, L. J., & Krendl, A. C. (2024). Evidence for the role of affective theory of mind in face-name associative memory. *Aging, Neuropsychology, and Cognition*, 31(3), 417-437.
- Hampshire, A., Highfield, R. R., Parkin, B. L., & Owen, A. M. (2012). Fractionating human intelligence. *Neuron*, 76(6), 1225-1237.
- Hickey, C., & Peelen, M. V. (2015). Neural mechanisms of incentive salience in naturalistic human vision. *Neuron*, 85(3), 512-518.
- Hitier, M., Sato, G., Zhang, Y.-F., Zheng, Y., Besnard, S., Smith, P. F., & Curthoys, I. S. (2016). Anatomy and surgical approach of rat's vestibular sensors and nerves. *Journal of Neuroscience Methods*, 270, 1-8.
- Ji, M., Su, X., Su, X., Chen, Y., Huang, W., Zhang, J., & Lu, X. (2014). Identification of novel compounds for human bitter taste receptors. *Chemical Biology & Drug Design*, 84(1), 63-74.
- Kolb, H. (1991). The neural organization of the human retina. In J. R. Heckenlively & G. B. Arden (Eds.), *Principles and practices of clinical electrophysiology of vision*. St. Louis: Mosby Year Book Inc.; p. 25-52.
- Kwon, G., Smith-Jackson, T., & Bostian, C. (2011). Socio-cognitive aspects of interoperability: Understanding communication task environments among different organizations. *ACM Transactions on Computer-Human Interaction*, 18(4), 1-21.
- Lazovic, B., Zlatkovic Svenda, M., Durmic, T., Stajic, Z., Duric, V., & Zugic, V. (2016). The regulation role of carotid body peripheral chemoreceptors in physiological and pathophysiological conditions. *Medicinski pregled*, 69(11-12), 385-390.
- Mahmoudi, B., & Erfanian, A. (2006). Electro-encephalogram based brain-computer interface: improved performance by mental practice and concentration skills. *Medical & Biological Engineering & Computing*, 44(11), 959-969.
- Mattick, J. S., & Mehler, M. F. (2008). RNA editing, DNA recoding and the evolution of human cognition. *Trends in Neurosciences*, 31(5), 227-233.
- Mazurek, K., Koprowska, N., Gajewski, J., Zmijewski, P., Skibniewski, F., & Rózanowski, K. (2018). Parachuting training improves autonomic control of the heart in novice parachute jumpers. *Biocybernetics and Biomedical Engineering*, 38(1), 181-189.

- Oakes, M., & Bor, R. (2010). The psychology of fear of flying (part I): A critical evaluation of current perspectives on the nature, prevalence and etiology of fear of flying. *Travel Medicine and Infectious Disease*, 8(6), 327-338.
- Paraclub Olymp Prague. (2024, April). Paraclub Olymp Prague, 2021 Skydiving logbook.
- Petty, R. E., & Briñol, P. (2015). Emotion and persuasion: Cognitive and meta-cognitive processes impact attitudes. *Cognition and Emotion*, 29(1), 1-26.
- Polyak, S. L. (1941). *The retina*. Chicago: University of Chicago Press.
- Popov, V., Marevic, I., Rummel, J., & Reder, L. (2018). Forgetting Is a Feature, Not a Bug: Intentionally Forgetting Some Things Helps Us Remember Others by Freeing Up Working Memory Resources. *Psychological Science*, 30, 1303 - 1317.
- Puthuchery, Z., Skipworth, J. R. A., Rawal, J., Loosemore, M., Van Someren, K., & Montgomery, H. E. (2011). Genetic influences in sport and physical performance. *Sports Medicine (Auckland)*, 41(10), 845-859.
- Robbins, B. G. (2016). What is Trust? A Multidisciplinary Review, Critique, and Synthesis. *Sociology Compass*, 10(10), 972-986.
- Rüsch, N., Corrigan, P. W., Wassel, A., Michaels, P., Olschewski, M., Wilkniss, S., & Batia, K. (2009). Ingroup perception and responses to stigma among persons with mental illness. *Acta Psychiatrica Scandinavica*, 120(4), 320-328.
- S. A. S. s.r.o. (2024, April). SKYDIVE & AIR SERVICE s.r.o., 2021 Aircraft flight log. SKYDIVE & AIR SERVICE s.r.o.
- Salassa, J. R., & Zapala, D. A. (2009). Love and Fear of Heights: The Pathophysiology and Psychology of Height Imbalance. *Wilderness & Environmental Medicine*, 20(4), 378-382.
- Sottek, R., & Genuit, K. (2005). Models of signal processing in human hearing. *AEU - International Journal of Electronics and Communications*, 59(3), 157-165.
- Tenenbaum, G., Lidor, R., Lavyan, N., Morrow, K., Tonnel, S., Gershgoren, A., Meis, J., & Johnson, M. (2004). The effect of music type on running perseverance and coping with effort sensations. *Psychology of Sport and Exercise*, 5(2), 89-109.
- Tuthill, J. C., & Azim, E. (2018). Proprioception. *Current Biology*, 28(5), R194-R203.
- van Gerven, M. A. J., Maris, E., Sperling, M., Sharan, A., Litt, B., Baltuch, G., & Jacobs, J. (2013). Decoding the memorization of individual stimuli with direct human brain recordings. *NeuroImage (Orlando, Fla.)*, 70, 223-232.
- Vishwanath, D., & Hibbard, P. B. (2013). Seeing in 3-D with just one eye: Stereopsis without binocular vision. *Psychological Science*, 24(9), 1673-1685.

Contact email: leonard.bernau@science21.cz