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Differences in the Semantic Differential of Beauty in the Context of an Individual's Art and Academic Education

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Abstract

The concept of Beauty is a frequently used but poorly defined term. Its interpretation in natural languages is influenced by numerous factors. This study focuses on potential differences in the understanding of the concept of Beauty by subjects who have gone through an academic education or an art education. It uses the semantic differential method with 21 bipolar adjectives grouped into the dimensions of activity, evaluation, and intensity. The results obtained from the analysis of the data from a sample of 2,206 participants (53.8% women) aged from 18 to 89 (M = 40.95; SD = 16.5) revealed that differences in the understanding of the concept of Beauty between those who had an artistic education and laypeople, and between individuals with higher and lower levels of academic education, are rare. For those with an academic education, significant differences ($p < 0.001$) are only manifested in the activity dimension (specifically in the adjective pairs: Fast/Slow and Strict/Lenient). For those with an artistic education, they only appear in the evaluation dimension (in the adjective pairs: Inspiring/Boring, Inviting/Repulsive, and Pleasant/Unpleasant).

Keywords: Beauty, term, differences, semantic differential, education

1. Introduction

The concept of Beauty is widely used but challenging to define, primarily due to the broad spectrum of connotations associated with it (Kenett et al., 2021). Several scientific disciplines have attempted to delineate it, including aesthetics (Dietrich & Knieper, 2022), ethics (Diessner, 2019), art (Sidhu et al., 2018), mathematics (Zeki et al., 2018), medicine (Feng, 2020), biology (Jones & Jaeger, 2019), psychology (Yarosh, 2019), and philosophy (Scruton, 2011). However, most of these disciplines have produced a definition from their specific perspective and these are not always universally applicable. Significant contributions have come from approaches that explore the understanding of the concept of Beauty in natural languages, either through an analysis of its connotations (Demuthova & Demuth, 2021; Page et al., 2021), an examination of common or artistic texts (Mikolov et al., 2013; de Boer et al.,

2018), or a characterisation of the concept of Beauty through the use of semantic differentials (e.g., Kenett et al., 2021).

The method of semantic differential (originally developed by Charles Osgood et al.) enables the measurement of individuals' subjective evaluations concerning a specific concept through the series of bipolar adjectives (see: Osgood 1957; Osgood et al., 1957). In practice, this means that an individual evaluates the chosen concept on a scale (usually seven-point) according to their belief about how close/far the concept is to one of two opposing adjectives (e.g., beautiful – ugly, fast – slow, etc.). Based on this evaluation, it is possible to attribute a value to the concept on a specific scale (e.g., on a scale of beauty, speed, etc.), which can then be displayed in the space between two points corresponding to two opposing poles – opposing adjectives. The semantic differential offers advantages such as a standardized method of measuring the meanings of words and concepts, the possibility of using bipolar scales to assess both positive and negative connotations of concepts, and a numerical scale allowing for precise measurement of participants' responses. Consequently, the evaluative scale measures the connotative meaning of concepts and, unlike other rating scales,it is universally applicable to almost any concept (Ploder & Eder, 2015).

An advantage of the semantic differential method is that the result is quantifiable, and thanks to the bipolarity of the scale, it measures both positive and negative variants of the relationship. Even this basic level of using the semantic differential enables working with a multitude of data – it is possible to assess how a chosen group of individuals, or even a broad population or culture, understands the evaluated concept in the context of the chosen criterion (e.g., within the assessment of beautiful – ugly). Additionally, comparisons can be made among individuals, groups, or different communities or cultures. Moreover, since the semantic differential provides data in a quantitative form, their meta-analysis can be conducted through factor analysis. In the early years of semantic differential usage, its authors primarily focused on identifying universal semantic dimensions through factor analysis (see, for example, Tanaka et al., 1963, or Ross, 1965), with Osgood et al. (1957) listing three fundamental universal dimensions of connotative meaning: potency, activity, and evaluation.

When evaluating data intended to describe the concept of Beauty, it becomes evident that several intervening variables need to be considered. The understanding of the concept of Beauty may be influenced by the language itself (e.g., by the etymology of the term – Demuth, 2022), as well as by various cultural (Jacobsen, 2010) and temporal (Sorokowski, 2010) specifics. It also appears that an individual's understanding of the concept of Beauty can also depend on their gender (Vavrova & Demuthova, 2021), age (Wulff et al., 2022), and other factors.

In this context, it is conceivable that an individual's education may also have an impact on their understanding of the concept of Beauty. An academic environment exerts a significant liberalising influence (Dey, 1996) and is characterised by cognitive sophistication (Gelepithis & Giani, 2022). As such, it leads to more open attitudes and opinions – as the level of education increases, the occurrence of prejudices (Kuppens & Spears, 2014; Scott, 2022) and negative attitudes (Rivera-Garrido, 2022) is significantly decreased. Therefore, it can be presumed that the understanding of the concept of Beauty among better educated individuals will be more complex, and they will be more open and less conservative in their evaluation.

Likewise, it can be expected that individuals who have had an artistic education will have a different approach to Beauty when compared to laypeople (those who have not had an artistic education). Firstly, they encounter beautiful objects more frequently, subject them to more detailed examination, and gradually develop a greater ability to perceive Beauty (Cantekin Elyağutu, 2016). They are also trained to find aspects of Beauty in unconventional or unusual

situations, objects, or configurations. Creative training and art education, for instance, lead to a greater degree of openness to new experiences (Ulger, 2016) and respect for the artistic traditions of different nations (Vladimirova et al., 2019). Thanks to training in openness and the ability to find Beauty in diverse forms, it is anticipated that individuals with an artistic education will have a broader perspective on the definition of Beauty. Moreover, it can be assumed that they may be more active in this area when compared to individuals without an artistic background.

However, research in this area is lacking, and the concept of Beauty, and the factors that contribute to its assessment are under-studied. Formulating relevant research hypotheses to investigate differences in the understanding of the concept of Beauty related to an academic or artistic education is thus challenging. Given the absence of comprehensive research on the understanding of the concept of Beauty in the context of an individual's education, an exploratory study was embarked upon and two research questions were formulated.

2. Research Questions

RQ1: Are there differences in the dimensions/items of the semantic differential for the concept of Beauty between individuals with higher or lower levels of academic education?
RQ2: Are there differences in the dimensions/items of the semantic differential for the concept of Beauty between individuals with an artistic education and those without?

3. Method

3.1 Procedure

The data collection was carried out through personal contacts between the researcher and the participants using an opportunity sampling method. Adult participants were approached in companies, corporations, universities, and various field settings. The participants voluntarily and anonymously provided data and were fully informed in advance of the purpose and nature of the information to be collected. They also had the right to withdraw from the research and data collection at any time without any consequences.

3.2 Instruments

The data was obtained through a two-part questionnaire. The first part informed the participants of the purpose of the research and once they had given informed consent, it collected basic demographic information (gender, age, education). The second section asked participants to describe the concept of "Beauty" using a prepared set of bipolar adjectives (see Table 1).

Table 1: Bipolar adjectives, categorised by dimension: activity, evaluation or potency, and the values at the extremes of evaluation

	Dimensions		
	Activity	Evaluation	Potency
Bipolar Adjectives	Aggressive/Moderate	Calm/Restless	Balanced/Unbalanced
	Erotic/Romantic	Good/Bad	Familiar/Strange
	Exciting/Soothing	Inspiring/Boring	Knowable/Unknowable
	Expressive/Inconspicuous	Inviting/Repulsive	Logical/Illogical
	Fast/Slow	Kind/Hateful	Orderly/Chaotic
	Impulsive/Judicious	Pleasant/Unpleasant	Simple/Complicated
	Strict/Lenient	Pure/Dirty	Understandable/Unintelligible

Source: Authors

This method involves the use of semantic differentials, where an individual evaluates a specific concept on a scale (typically a Likert scale) based on their belief about how close/far the given

concept is to one of two opposing adjectives (e.g., beautiful – ugly, fast – slow, and so on – for an example, see Table 2).

Table 2: An example of the adjective evaluation within the semantic differential

	Strongly Agree	Agree	Slightly Agree	"In the Middle"	Slightly Agree	Agree	Strongly Agree	
Pleasant	1	2	3	4	5	6	7	Unpleasant

Source: Authors

To remain consistent with the original approach used in semantic differential (Osgood 1957; Osgood et al. 1957), these adjectives were loaded into three separate factors – activity, evaluation, and intensity. The internal consistency for the activity dimension was lower (α = 0.573), while for the evaluation and intensity dimensions, the values were satisfactory (αevaluation = 0.763; αintensity = 0.745).

3.3 Participants

The research sample was made up of 2,220 participants; 0.6% of them (N = 14) were excluded from any further analysis due to missing data. The final dataset was comprised of 2,206 participants from 18 to 89 (M = 40.95; SD = 16.5), of whom 1,187 (53.8%) were women. Regarding education, the sample was divided into two groups – a "lower academic education" group composed of participants with basic and high school education, and a "higher academic education" group made up of 1,386 participants (62.8%) with undergraduate, graduate or postgraduate degrees (BA, MA, & Ph.D.). In addition to overall education, specific attention was also paid to an artistic education. 275 participants (12.5%) had completed a form of extended artistic education (specialised "art schools") at various levels (referred to as the "artistic education" group). Within the state educational system, the minimum duration of further education in the arts is 4 years.

3.4 Data Analysis

The statistical analyses were conducted using the IBM Statistical Package for Social Sciences (SPSS), version 28. To examine differences between the participant groups in various categories and items of the semantic differential, non-parametric Mann-Whitney U Tests were carried out. The threshold for statistical significance was set at 95%, corresponding to a significance level of 0.05.

4. Results

4.1 Research Question 1

Differences in the three dimensions of the semantic differential (activity, evaluation, and intensity) for the concept of Beauty were sought for individuals with higher and lower levels of academic education using a Mann-Whitney U Test (see Table 3).

Table 3: Differences in the dimensions of the semantic differential for the concept of Beauty between individuals with higher and lower levels of academic education (Mann-Whitney U test)

		Dimension		
		Activity	Evaluation	Potency
		Mean Rank	Mean Rank	Mean Rank
Academic Education	Lower level	1,051.78	1,085.36	1,068.08
	Higher level	1,123.53	1,076.32	1,090.61
Mann-Whitney	U	579,386.50	541,751.00	553,243.00
	Asymp. Sig.	**0.010***	0.745	0,415

*Note. *p < 0.05*
Source: Authors

From the results, it is evident that a difference between individuals with higher and lower levels of academic education was only found in the activity dimension. Individuals with a lower level of academic education were generally more active (the Mean Rank values were closer to the poles, indicating a higher level of activity/activation). An item analysis within the activity dimension revealed that this statistically significant difference was primarily caused by a pronounced disparity in the understanding of the concept of Beauty within two bipolar adjective pairs, fast/slow and strict/lenient. Individuals with a higher level of academic education perceived Beauty to be slower and more lenient than individuals with a lower level of academic education (see Table 4).

Table 4: Differences in the items within the activity dimension for the semantic differential for the concept of Beauty between individuals with higher and lower levels of academic education (Mann-Whitney U test)

			Bipolar adjective	
			Fast/Slow	Strict/Lenient
Academic Education	Lower level	Mean Rank	1,063.71	1,064.11
	Higher level		1,151.57	1,153.99
Mann-Whitney	U		607,016.00	607,982.50
	Asymp. Sig.		**<0.001*** **	**<0.001*** **

*Note. ***p < 0.001*
Source: Authors

4.2 Research Question 2

Differences in the three dimensions of the semantic differential (activity, evaluation, and intensity) for the concept of Beauty were examined, between individuals with an artistic education and those without, using a Mann-Whitney U Test (see Table 5).

From the results, it is evident that the dimensions of the concept of Beauty differed between individuals who have completed an artistic education and those who have not, specifically in the evaluation dimension. An item analysis of the evaluation dimension revealed that this statistically significant difference was primarily caused by a pronounced disparity in the understanding of the concept of Beauty within three bipolar adjectives: Inspiring/Boring, Inviting/Repulsive, and Pleasant/Unpleasant. Individuals with an artistic education rated Beauty as something that is very inspiring, inviting, and pleasant when compared to individuals without an artistic education who perceived Beauty to be less inspiring, inviting, and pleasant (see Table 6).

Table 5: Differences in the dimensions of the semantic differential for the concept of Beauty between individuals with an artistic education and those without (Mann-Whitney U test)

		Dimension		
		Activity	Evaluation	Potency
		Mean Rank	Mean Rank	Mean Rank
Artistic Education	No	1,080.00	1,097.33	1,068.15
	Yes	1,072.96	1,024.91	1,107.71
Mann-Whitney	U	386,303.00	364,299.50	399,616.00
	Asymp. Sig.	0.830	**0.027***	0.228

*Note. *p < 0.05*
Source: Authors

Table 6: Differences in the items within the evaluation dimension for the semantic differential for the concept of Beauty between individuals with and without an artistic education (Mann-Whitney U test)

			Bipolar Adjective		
			Inspiring/Boring	Inviting/Repulsive	Pleasant/Unpleasant
Artistic	No	Mean	1,128.78	1,113.87	1,113.83
Education	Yes	Rank	990.37	1,033.78	1,053.09
Mann-Whitney	U		352,175.50	370,653.00	381,343.00
	Asymp. Sig.		**<0.001*** **	**0.012***	**0.046***

*Note. * p < 0.05; ***p < 0.001*
Source: Authors

5. Discussion

The examination of the differences in the understanding of the concept of Beauty between individuals with higher or lower levels of academic education (research question 1) and individuals with an artistic education, from an educational institution, and those without it (research question 2) has yielded several findings. A higher level of academic education was only associated with differences in the activity dimension. Individuals with a higher level of academic education perceived Beauty to be slower and more lenient than individuals with a lower level of academic education. It is possible that a higher level of academic education teaches individuals to be more thoughtful, to not jump to hasty or impulsive conclusions. The development of critical thinking in university students is one of the desired outcomes of higher education (Bellaera et al., 2021). Therefore, it is possible that when they encounter Beauty, those individuals with a higher level of education are prompted to explore it, analyse it, and contemplate and not jump to impulsive conclusions. This type of reactions to the presence of Beauty may be manifested, in better educated individuals, such that Beauty appears to be slower than it does for individuals with a lower level of education. The difference found in the evaluation of the concept of Beauty for the bipolar adjective pair strict/lenient can be interpreted in a similar way. Critical thinking is associated, for example, with inquisitiveness, with flexibility when considering stereotypes or biases, with open-mindedness towards differences and options, prudence in making judgments, and the willingness to consider and revise a viewpoint through reflection (Yuan et al., 2020). All of these are characteristics that generally lead to making lenient rather than strict judgments. The completion of specialised artistic education, at an educational institution, (research question 2) compared to those without such an education only produced differences in the evaluation dimension. Individuals who had completed an artistic education perceived Beauty to be more inspiring, inviting, and pleasant. Beauty is a significant parameter of the realm of art. For individuals who are engaged in the arts, it represents inspiration, its presence evokes strong positive emotions (it is highly pleasant), and it has an inviting impact. Beauty serves as a source of inspiration, provides material for their work, and is often the purpose of their activity.

The results of the analyses carried out also suggest that most of the dimensions and items examined to produce the semantic differential for the concept of Beauty showed no significant differences between the participants with higher or lower levels of education. It seems that education does not significantly modify one's perception of Beauty. It is likely that there are variables that were not included in the research study that play a more substantial role in shaping the concept of Beauty. According to Demuthova & Demuth, when evaluating the concept of beauty, a gender is very important. Regarding the examination of gender specificities, the most significant differences in the semantic differential of Beauty concept were found in the dimension of evaluation (Demuthova & Demuth 2023). Gender differences in evaluating the concept of beauty and connected terms (such as: elegance, sexiness, grace) were identified also by Menninghaus et al. (2019).

The relative similarity of the concept of Beauty between the educated and less educate group could be explained also through the influence by components common to both groups, such as culture or the contemporary context. It is possible that due to the popularisation of art, trends prominent among the cohort of artists quickly reach the general population, greatly blurring the differences in the preferences for Beauty between "artists" and "laypeople". The close connection between artistic culture and the "common" environment has always existed – centuries ago (before the invention of the camera), Beauty could only be documented through art (Turan, 2023), and the population largely came into contact with Beauty through art. Nowadays, there are many more opportunities to convey an artist's perspective and consequently art is much more accessible to laypeople. Isolated studies, focused on examining similarities/differences in the perception of Beauty in various fields or between artists and professionals, have also suggested that there are multiple synergies between various fields and that the same beautiful object can often be enjoyed by laypeople and experts alike (Perc, 2020).

6. Conclusions

To allow the delimitation and definition of complex concepts, in addition to academic approaches, it is essential to explore their meanings and connotations among ordinary language users. In the case of the concept of Beauty, it becomes evident that the way it is understood in a natural language is influenced by a number of variables. In addition to factors such as culture and the age or gender of the subject, the educational background of the evaluator has emerged as a significant variable. Based on the research conducted, it can be asserted that in the assessment of the connotations of the term Beauty, a higher level of academic education primarily affects the activity dimension whereas an artistic education is connected with the evaluation domain. It is apparent that to fully comprehend such an undoubtedly complex and multidimensional concept as Beauty, a thorough and detailed analysis of its meanings in diverse environments and different groups of language users is required.

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References

Bellaera, L., Weinstein-Jones, Y., Ilie, S., & Baker, S.T. (2021). Critical thinking in practice: The priorities and practices of instructors teaching in higher education. *Thinking Skills and Creativity, 41*(4), 100856. https://doi.org/10.1016/j.tsc.2021.100856

Cantekin Elyağutu, D. (2016). Importance of art education. *Art-Sanat, 6*, 243–247. https://dergipark.org.tr/tr/download/article-file/229873

de Boer, J. N., Voppel, A. E., Begemann, M. J. H., Schnack, H. G., Wijnen, F., & Sommer, I. E. C. (2018). Clinical use of semantic space models in psychiatry and neurology: A systematic review and meta-analysis. *Neuroscience and Biobehavioral Reviews, 93*, 85–92. https://doi.org/10.1016/j.neubiorev.2018.06.008

Demuth, A. (2022). Krátka úvaha o dôvodoch vágnosti pojmu krása. [A brief inquiry into the reasons for the vagueness of the concept of beauty]. In: A. Kobetič, & A. Korcsmáros (eds.), *Je ešte čo interpretovať?* [Is there anything else to interpret?] (pp. 165–176). Trnavské umenovedné centrum.

Demuthova, S., & Demuth, A. (2021). A Frequency and semantic analysis of the most frequent connotations of the notion of beauty. *European Journal of Behavioral Sciences, 4*(1), 1–11. https://doi.org/10.33422/ejbs.v4i1.611

Demuthova, S., & Demuth, A. (2023). Semantic differential of the concept of beauty. Journal of Advanced Research in Social Sciences, 6(3), 66-75. https://doi.org/10.33422/jarss.v6i3.1056

Dey, E. L. (1996). Undergraduate political attitudes: An examination of peer, faculty, and social influences. *Research in Higher Education, 37,* 535–554. https://doi.org/10.1007/BF01724937

Diessner, R. (2019). *Understanding the Beauty Appreciation Trait.* Palgrave Macmillan.

Dietrich, P., & Knieper, T. (2022). (Neuro)Aesthetics: Beauty, ugliness, and ethics. *PsyCh journal, 11*(5), 619–627. https://doi.org/10.1002/pchj.478

Feng L. F. (2020). Characteristics and emerging trends in modern aesthetic medicine. *Chinese Medical Journal, 133*(6), 741–742. https://doi.org/10.1097/CM9.0000000000000679

Gelepithis, M., & Giani, M. (2022). Inclusion without solidarity: education, economic security, and attitudes toward redistribution. *Political Studies, 70*(1), 45–61. https://doi.org/10.1177/0032321720933082

Jacobsen T. (2010). Beauty and the brain: culture, history and individual differences in aesthetic appreciation. *Journal of Anatomy, 216*(2), 184–191. https://doi.org/10.1111/j.1469-7580.2009.01164.x

Jones, A. L., & Jaeger, B. (2019). Biological bases of Beauty revisited: the effect of symmetry, averageness, and sexual dimorphism on female facial attractiveness. *Symmetry, 11*(2), 279. https://doi.org/10.3390/sym11020279

Kenett, Y. N., Ungar, L., & Chatterjee, A. (2021). Beauty and wellness in the semantic memory of the beholder. *Frontiers in Psychology, 12,* 696507. https://doi.org/10.3389/fpsyg.2021.696507

Kuppens, T., & Spears, R. (2014). You don't have to be well-educated to be an aversive racist, but it helps. *Social Science Research, 45,* 211–223. https://doi.org/10.1016/j.ssresearch.2014.01.006

Menninghaus, W., Wagner, V., Kegel, V., Knoop, C. A., & Schlotz, W. (2019). Beauty, elegance, grace, and sexiness compared. PloS one, 14(6), e0218728. https://doi.org/10.1371/journal.pone.0218728

Mikolov, T., Sutskever, I., Chen, K., Corrado, G., & Dean, J. (2013). Distributed representations of words and phrases and their compositionality. In *NIPS'13: Proceedings of the 26th International Conference on Neural Information Processing Systems* (pp. 3111–3119). Curran Associates Inc., Red Hook. https://doi.org/10.48550/arXiv.1310.4546

Osgood, C. E. (1957). Measurement of meaning. *Psychological Bulletin, 54*(4), 390–407.

Osgood, Ch. E., Suci, G., & Tannenbaum, P. (1957). *The Measurement of Meaning*. University of Illinois Press.

Page, S. A., Collisson, B. A., Godley, J., Nguyen, D., Metz, L., & Muruve, D. (2021). How semantics connotations may influence concerns about donation of biospecimens. *Biopreservation and Biobanking, 19*(3), 156–162. https://doi.org/10.1089/bio.2020.0072

Perc, M. (2020). Beauty in artistic expressions through the eyes of networks and physics. *Journal of the Royal Society Interface, 164*, 20190686. https://doi.org/10.1098/rsif.2019.0686

Ploder, A. & Eder, A. (2015). Semantic Differential. In J. D. Wright (ed.), International Encyclopedia of the Social & Behavioral Sciences. (Second Edition) (pp. 563–571), Amsterdam: Elsevier. https://doi.org/10.1016/B978-0-08-097086-8.03231-1

Rivera-Garrido, N. (2022). Can education reduce traditional gender role attitudes?, *Economics of Education Review, 89*, 102261. https://doi.org/10.1016/j.econedurev.2022.102261

Ross, J. (1965). Change in the use of the semantic differential with a change in context. Journal of Verbal Learning and Verbal Behavior, 4(2), 148-151. https://doi.org/10.1016/S0022-5371(65)80099-8

Scott, R. (2022). Does university make you more liberal? Estimating the within-individual effects of higher education on political values. *Electoral Studies, 77*, 102471. https://doi.org/10.1016/j.electstud.2022.102471

Scruton, R. (2011). *Beauty: A Very Short Introduction*. (Illustrated ed.) Oxford University Press.

Sidhu, D. M., McDougall, K. H., Jalava, S. T., & Bodner, G. E. (2018). Prediction of beauty and liking ratings for abstract and representational paintings using subjective and objective measures. *PLoS ONE 13*(7), e0200431. https://doi.org/10.1371/journal.pone.0200431

Sorokowski P. (2010). Did Venus have long legs? Beauty standards from various historical periods reflected in works of art. *Perception, 39*(10), 1427–1430. https://doi.org/10.1068/p6621

Tanaka, Y., Oyama, T., & Osgood, C. E. (1963). A cross-culture and cross-concept study of the generality of semantic spaces. Journal of Verbal Learning & Verbal Behavior, 2(5-6), 392–405. https://doi.org/10.1016/S0022-5371(63)80040-7

Turan, F. (2023). The concept of beauty in art. In I. Vargel, & Ozgur, F. (eds.), *Beauty, Aging, and AntiAging* (pp. 21-31). Academic Press.

Ulger, K. (2016). The creative training in the visual arts education. *Thinking Skills and Creativity, 19*, 73–87. https://doi.org/10.1016/j.tsc.2015.10.007

Vavrova, M., & Demuthova, S. (2021). Interpohlavné rozdiely v konotátoch pojmu krása. [Sex differences in the connotations of the concept of beauty]. In Z. Rojkova, & D. Kochanova (eds.), *Kondášove dni 2021* [Kondas´ Days] (pp. 69–76). Katedra psychológie FF UCM v Trnave.

Vladimirova, S. V., Aryabkina, I. V., Beregovaya, E. B., Stukalova, O. V., & Alekseeva*, L. L. (2019). Art Education And Its Impact Effects On Modern Students. In S. K. Lo (ed.), Education Environment for the Information Age, vol 69. *European Proceedings of Social and Behavioural Sciences* (pp. 57–66). Future Academy. https://doi.org/10.15405/epsbs.2019.09.02.8

Wulff, D. U., Hills, T. T., & Mata, R. (2022). Structural differences in the semantic networks of younger and older adults. *Scientific Reports, 12*(1), 21459. https://doi.org/10.1038/s41598-022-11698-4

Yarosh D. B. (2019). Perception and deception: human Beauty and the brain. *Behavioral Sciences, 9*(4), 34. https://doi.org/10.3390/bs9040034

Yuan, R., Yang, M., & Stapleton, P. (2020). Enhancing undergraduates' critical thinking through research engagement: A practitioner research approach. *Thinking Skills and Creativity, 38*. https://doi.org/10.1016/j.tsc.2020.100737

Zeki, S., Chén, O. Y., & Romaya, J. P. (2018). The biological basis of mathematical Beauty. *Frontiers in Human Neuroscience, 12*, 467. https://doi.org/10.3389/fnhum.2018.00467