

Measurement of Happiness: Refined Approaches to the Evaluation of Happiness as a Complex Emotion

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Abstract: Happiness as a sophisticated human emotion has been perplexing the psychological community due to the numerous challenges that stand in the way of achieving accurate objective measurements. Unlike conditions such as depression, where the field of psychiatry has found approaches of measurement through the widely studied neurological system with anatomical structures and neurotransmitters, the indicators of happiness remained unclear for an extended period of time in the psychological field. Hence, the common approaches to measuring happiness in the present day highly depend on self-reports through the form of questionnaires, leading to potential biases and inaccuracies. This paper consists of an overview of the barriers that constitute hardships of measurement, and reviews of literature studies that suggest novel ways of making the measurement of happiness subjective and concrete. With the advancement in the understanding of the neurological, behavioral, physiological, as well as alternative approaches, the measurement of happiness could potentially see a surge in accuracy. It is only with continuous development and sparks of advanced ideas that the concept of happiness can be assured with finer understanding.

Keywords: Eudaimonia, Hedonic, Happiness, Measurements, Subjective well-being.

1. Introduction

Beginning from Ancient Greek, the inquiry of what defines a happy life has been among the most prevalent discussions of newly established civilizations [1]; Buddhist texts articulate the need to attain Sukha, an optimal pursuit of happiness [2]; sustaining to the present day, the US Declaration of Independence and UK's life satisfaction measures all pinpoint the pursuit of happiness as an essential need of human being. But, what does happiness mean? Questing for "Happiness" in the dictionary, keywords of well-being, contentment, pleasurable, and satisfying constitute the term's definition [3]. The American Psychological Association directly bridges this state of emotion to subjective well-being, referring to both pleasant pleasure and an overall positive evaluation of life [4]. Even though some progress has been made in defining this term, psychologists are still paving their pathway toward the unearthing of firm facts regarding the emotion of happiness. The uncertainties in definition steers into the challenges of measuring happiness. Considering issues of relativity and social desirability biases, happiness measurements require refining to minimize the subjective factors that individuals contribute to the happiness tests. With the development of psychological understanding, advanced approaches could to strengthen the accuracy of happiness measurements, hence making substantial contributions to the field.

2. The Complex Nature of Happiness

2.1. Components of Happiness

Happiness emotion has an extremely intricate underlying nature, both in its definition and its ways of measurement. Martin Seligman, known as the father of the newly rising discipline of positive psychology, pioneered the establishment of the PERMA model to hypothesize the underlying components of happiness. The model is applied in the Authentic Happiness Inventory and outlines the components being positive emotions, engagement,

relationships, meaning, and accomplishment [5]. Adjacent theories compiled by other psychologists obtain moderately different views, such as the three-part theory suggested by Andrews and Withey consisting of satisfaction along with both positive and negative effects. Over years of debate, no consensus has been reached [6].

2.2. Barriers to Accurate Measurement

Despite the presence of models and scientific theories developed to account for the targeted elements of happiness, the measurement of happiness remains puzzling to the scientific community. One aspect contributing to the complexity of happiness originates from its ability to be specified into two subdivisions, one being hedonic and the other being eudaimonic. Hedonic measurements can more easily be obtained as they capture the short-term transitory moments, which individuals can recall with ease. The eudaimonia side, however, is more enduring and decisive for one's well-being, its expansive scale makes it harder to identify [7].

The complex nature also ties closely with the ways happiness is elicited. Many researchers attempt to utilize the cause-and-effect relationship, attempting to capture the presence of causes of happiness but fail to do so due to multiple reasons. Due to relativity, the causes of happiness differ across individuals possessing different cultures and beliefs [8]. For some, wealth may be a crucial factor for the upbringing of happiness, while it may be families and friends for others. It would thus not be optimal to standardize the weighting of different factors. Furthermore, as suggested by Sonja Lyubomirsky, a psychology professor, in her publication of "The How of Happiness", life circumstances as a measurable factor only make up ten percent of what arouses happiness. Instead, the heavier proportions land on the setpoint pre-determined by birth variabilities and intentional activities that take up fifty and forty percent respectively [9]. Once again, the distribution of significance showcases the unreliability to measure happiness from its causes.

3. Measurements of Happiness

3.1. Common Approaches

Switching the measurement target to the effect of emotion, the common approaches to measuring happiness usually include self-reports through completing chosen developed happiness tests and scales. The tests involve a series of questions requesting participants to offer ratings on their emotional status in order to provide researchers with insights and sources of data analysis [10]. However, how could such an approach be applicable when the subject is an infant or one without sufficient cognitive and linguistic abilities? On another note, how do humans completely set aside our cognitive biases while possessing social desirability? The many obstacles sum up to the subjective nature of emotion recognition. While happiness as an affective reaction certainly associates with conscious affective feelings, studies should prioritize the affective state, highlighting the objective aspects of neural, behavioral, and physiological reactions.

3.2. Neurological Approaches

The investigation of the neurological basis of happiness has regularly been associated with pleasure, as neural overlaps have been discovered between pleasure and hedonic brain systems. Research on humans and rodents has supported the approximation of the hedonic brain circuitry, identifying the activated areas of OFC, ACC, insular opioids, as well as cannabinoids achieved by events associated with pleasure [11]. Such a large number of active sites clearly demonstrates the extensive and highly distributive brain coding in response to the hedonic states, spreading across the deep brain and other sites located in the cortex. The numerous options increase the feasibility of using medical technologies including but not limited to Position Emission Topography and Functional Magnetic Resonance Imaging to detect alterations of the neural correlates [12]. To further limit the scale of medical testing, hedonic hotspots such as the nucleus accumbent shell, ventral palladium, and limbic cortical regions, as well as certain brainstem regions, are all focuses of neurological measurements. Although the hedonic side occupies a larger proportion of the research on happiness, neurologists managed to progress by drawing the conclusion that individuals with frontal regions possessing a higher density of opiate receptors are likely to be linked with a higher degree of both hedonic and eudaimonic happiness [13]. Through the stimulation of neurochemical receptors, the aforementioned regions and hotspots will display observable changes, detecting happiness.

Other studies impose a spotlight on the precuneus as a neural structure that reflects the combination of happy emotions and life satisfaction. Wataru Sato from Kyoto University led his research team in locating the medial parietal lobe at the top back region of the brain to be associated with key functions required for emotion including episodic memory, self-reflection, and consciousness [14]. Specifically in the parietal lobe, the research concluded the positive relationship existing between the volume of grey matter possessed by the right precuneus and the subjective happiness score rated by individuals themselves. Figure 1 illustrates both the position of the precuneus and its volume in relation to happiness. When having a larger size with more content, the precuneus incorporates a larger number of neurons that functions to release information more efficiently

through axon signaling. As a result, the precuneus synthesizes both the emotional and cognitive components to mediate one's overall happiness.

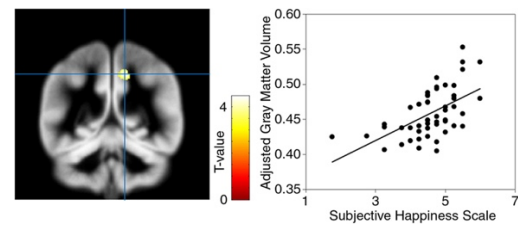


Figure 1. Precuneus and its correlation with happiness (neurocritic from Sato et al., 2015)

To measure happiness using the neurological approach, whether targeting the precuneus or any other regions associated with hedonic and eudaimonic happiness, two main methodologies are applied with the support of medical technologies and procedures. One methodology is neural coding, where appropriate neuroimaging techniques examine the changes in brain activity while the individuals experience exposure to pleasant stimuli. Neural causation as the other methodology involves the manipulation of anatomical brain structures to elicit pleasant emotions [15]. With both methods achieving the same measurement, neural coding is regarded as more optimal considering the low level of intrusiveness, helping subjects avoid risks.

3.3. Behavioral Approaches

Alternatively, the behavioral aspect, including multiple factors such as facial expressions, body language, and level of engagement in social activities, can all serve as variables to assess the happiness of individuals. Beginning with facial expressions, the innate ability to utilize nonverbal signaling is crucial to social interactions. To better understand how facial expressions are applied to happiness, scientists Paul Ekman pioneered the study of emotions with the Facial Action Coding System (FACS) along with Wallace Friesen. Dividing up facial muscles into 44 distinct action units, the thousands of combinations are representative of the complex compound emotions possessed by humans. Upon completing a large number of trials, the emotion of happiness is testified to activate zygomatic major and orbicularis oculi, producing movements of raised mouth corners and crinkled eyes [16]. Using the FACS or systems with similar functions, the frequency of exhibiting action units that resemble happiness will measure such emotion. Additionally, there is universality in emotion recognition. Despite the minor variations brought by culture and personal experiences, the interpretation of emotions through facial expressions remains relatively unanimous, even infants only six months of age have the capability to distinguish happy and sad faces [17]. The universality characteristic possessed by facial expressions confirms and expands the validity of this approach among individuals and populations. Other behaviors such as laughter, good appetite, and fine sleeping qualities, provide additional evidence for happiness. In a sample study involving infant subjects, the parental ratings of their child's happiness show high relevancy to the observable behaviors of laughter and degree of engagement with their environment [18]. Using other factors addressed in the human behavioral sector, unlike facial expressions, could lead to disagreements when individuals with different genders and cultures approach

emotions with moderately differing behaviors and attitudes, affecting the scale of application of happiness measurements. Hence, the limitations should not be neglected when considering the accuracy of measurements using the behavioral method.

3.4. Physiological Approaches

Another way of approaching the measurement of happiness is through the physiological aspect, where physical changes in one's body conditions could reflect internal emotions, including happiness. One major physiological factor is Heart Rate Variability (HRV), defining the extent of variation in time between consecutive heartbeats. Experiments prove the direct relationship between the positivity of emotion and HRV. Fundamentally, HRV is influenced by the Parasympathetic Nervous System (PNS) as a component of the Autonomic Nervous System [19]. With happiness as a positive emotion activating the PNS, the specifics of heart rate measured through electrocardiography and quantified through domain measures could serve to detect changes in one's happiness. Simultaneously fitting under the physiological category, levels of cortisol are also an effective measure of happiness. The hormone of cortisol functioning to respond to stress is regulated by the adrenal gland, with low levels of cortisol implying the presence of happiness. While multiple bodily fluids, including saliva, urine, and blood, could all be used as samples collected for cortisol. However, due to the non-invasive and easily collected features, salivary cortisol is most commonly used. Upon analyzing the amount of cortisol present in the sample through enzyme-linked immunosorbent assays and radioimmunoassay, measurement of happiness can be achieved [20].

3.5. Alternative Approaches

Extending the scale of measurement beyond individuals living in the present era, interdisciplinary researchers across the fields of psychology and computational linguistics discovered the usage of written expression as a way to estimate the degree of happiness. Scholars extracted excerpts of textual documentation such as works of literature, news reports, and lyrics to analyze the choice of diction in connection to the associated emotions. The concept of valence takes the form of a numerical scale that ranges in the positivity of emotions elicited in the study participants when encountering the words. Figure 2 illustrates the normalized frequency in correspondence to the varying valence level from words, with exemplary words listed on the right. Spanning geographical regions with translated works and time periods covering from 1800 to 2000, the findings from the weighted average data suggest noticeable drops in the valence value once during the early 1900s and another during the mid-1900s, matching the times of the First and Second World Wars, respectively [21]. The significant indication of unhappiness establishes the relationship between linguistic and national mental state, and at the same time proves the validity of this innovative measurement of happiness.

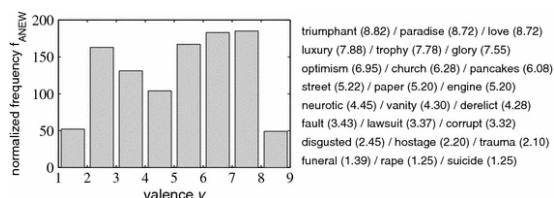


Figure 2. valence levels of selected terms (Dodds & Danforth)

4. Conclusion

Psychological research on the measurements of happiness remains essential for the well-being of the entirety of human society. Not only does positive emotion serve to improve the living quality of individuals through enhanced psychological and physical health, but it will also help to guide the establishment of public policies as happiness could play a determining role in social progress and economic development. The wide variety of approaches to measuring happiness discussed above lightens the pathway forward in the obtainment of accurate results regarding this emotion. Advanced progress made in research enlightens the measuring of happiness from a seemingly challenging task to one with numerous possibilities. Moving beyond the many uncertainties of results gathered from subjective self-reports, the neurological, behavioral, and physiological approaches may offer measurements with higher quality.

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