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Connectedness to Nature: Investigating Tendencies in Search Result Contents amongst popular New Media Platforms

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Table of Contents

Contents

Acknowledgement

Abstract

Human-nature connection in the modern age is an important issue, especially when real contact with nature is limited in urban environment. People's subjective perception of this relationship is their connectedness to nature, which is expressed on the new media (represented by the Internet). This study aimed to explore what tendencies were presented on the most general and popular online platforms about information of this topic. Text analysis was conducted on samples of search engine, video platform, informal online article, as well as academic journal article for structure comparison. Qualitative reviews were also conducted to aid in interpretation. Results showed popular contents involving children, communities, positive effects, direct experience and activities. People's approach to experiencing nature and their perception of self in nature were discussed. With digital technology having more and more influence on people's lives, it should serve as a tool to help us improve our relationship with nature and not the other way around.

Keywords

Nature, connection, connectedness, bibliometrics, Internet, children, perception, Google, Youtube, blog

Introduction – Literature review

1/ Overview and concepts

1.1. Overview

As humans - biological beings – living on the Earth and depend on various natural processes to survive and thrive, we all have a connection to nature. As the whole humanity, this connection can be strong or weak due to changes in our living environment. Our relationship with nature in the future can become very different, but at the moment it is undeniable that this is a relationship that we truly rely on. As each individual, the connection we feel towards nature also varies greatly. Some describe themselves as nature-lovers while some hardly care about those outside their artificial environment. In ancient time mankind lived in the heart of nature so knowledge to survive in it and strong feelings towards it, whether fear or love, were an obvious part of humans' lives. As civilizations advanced, besides more romantic emotions towards the mysterious cosmos we also learned about various complex structures, functions, and processes of the natural world. Then modernity came with the cost of environmental damage. The modern generations are living in the time of great changes, trying to create a path to where the Earth's ecosystem would still keep us alive and thriving in the future. What they think and feel about nature is crucial since it is a powerful driving factor towards what they do for it. With those thoughts and feelings, how a person put oneself in relation to nature is the connectedness to nature.

Nature has been well known to have many benefits to both physical and mental health throughout history from the ancient time in many different cultures. For example recently the Japanese traditional therapy Forest-bathing (shinrin-yoku) received a lot of attention on the media due to its health benefits, as also consistently confirmed by researchers (Payne & Delphinus, 2019). Experiencing nature, from being an unquestionably obviousness in the ancient time, has become an issue of debate and focused study since many people in the modern world do not spend enough time in their life in contact with the natural world. Nature exposure or experience in general has various benefits to humans, and has been used clinically in certain situations. The amount of scientific evidence of this matter is large and studies on the topic will probably continue to be the

spotlight in health science. More and more recent studies kept further enforcing the role of nature for human well-being (Bratman, Daily, Levy, & Gross, 2015; Gagliardi & Piccinini, 2019; Kabisch, van den Bosch, & Lafortezza, 2017; Wolf, Measells, Grado, & Robbins, 2015). Changes in our living environment is the big reason leading to nature exposure relating health issues as urban environment has become increasingly artificial. Urban population percentage globally in 2018 is nearly 55% (The World Bank, 2018). To improve the quality of urban environment and surrounding areas for residents on various aspects such as air, water, soil, landscape, noise, temperature, as well as to combat climate change, urban "nature-based solutions" particularly with the focus on re-naturing cities became a popular topic for academic research and policy making (Frantzeskaki, 2019; Lafortezza & Sanesi, 2019). Experiencing nature not only provides direct benefits, but also increases the likelihood of engaging in pro-environmental behaviors, furthermore improving the relationship between human and nature (Dean, Barnett, Wilson, & Turrell, 2019; Prévot, Cheval, Raymond, & Cosquer, 2018). Direct contact with nature seems to be in itself a powerful driving force towards a mutual beneficial relationship with clear incentives for the human side, both from individual and collective perspective.

The benefits of experiencing nature on health and various crucial roles of the natural world in relation to humanity has been scientifically studied quite intensely, though there is still much to know. However, what is our current understanding about the subjective aspects of the relationship between human and nature – the connectedness? Personal perception of nature in relation with self is more of a subjective phenomenon compared to experiencing nature which is more of an objective phenomenon. Due to the difference in this fundamental quality, researching connectedness to nature is different in approach methods. More information about this subject is presented in other part of the introduction section below. Connectedness to nature is a relatively new field of scientific study and has gained more interest recently, especially with the increasing urbanization and lack of nature contact in the younger generations. Outside of the scientific system, people have been contemplating how they think and feel about the vast natural world since ancient time, as reflected in major ancient philosophies and religious teachings (Gottlieb, 2003). Although holding different fundamental qualities, experiencing nature and perceived connectedness to it are two rather two sides of the same coin – our relationship to nature, objectively and subjectively. Connectedness to nature was also found to have positive association with human well-being both physically and mentally (Cleary, Fielding, Bell, Murray, & Roiko, 2017; Howell, Dopko, Passmore, & Buro, 2011; Mayer &

Frantz, 2004; Piccininni, Michaelson, Janssen, & Pickett, 2018; Poon, Teng, Chow, & Chen, 2015; Razak, Othman, & Nazir, 2016; Swami, Barron, Weis, & Furnham, 2016; Zhang, Howell, & Iyer, 2014). Connectedness to nature is also a factor which predicts pro-environmental behaviors (Barbaro & Pickett, 2016; C. Frantz, Mayer, Norton, & Rock, 2005; Gosling & Williams, 2010; Hughes, Richardson, & Lumber, 2018; Martin & Czellar, 2017; Otto & Pensini, 2017; Schultz, Shriver, Tabanico, & Khazian, 2004).

Connectedness to nature is individual perception, but the information of it is shared among many people. Every human has some degree of this subjective connectedness towards nature. In life, interactions with natural elements are inevitable (at the lowest level we cannot exist as a human without our biological body). In some people the connectedness is stronger and in some weaker. People may also not be aware of such thoughts and feelings until evoked. Also as a social species, we share experiences and ideas with each other and learn from that shared information. People will search for others' views of themselves in nature; and people will want to share their opinions on certain topics as well as experiences of certain events. So the question comes that how normal people express their connectedness to nature as information to other fellow humans.

With modern technology of the media, information is not only shared and accessed within small circles like families and friends (though being more frequent) but also among many others in the whole world. There are about 4.4 billion active Internet users globally in 2019, and more than 80% of population in developed regions uses the Internet frequently in 2017 (Internetlivestats.com). The new media, which represented by the Internet, have become increasingly popular in normal people's life. Normal digital information is convenient to store and access, especially with the constant development of better new devices and management systems. Realizing the importance of the new media in modern life, academic researchers have also been trying to promote their work or making impacts to society through the means of the new media (Reynolds & Sun, 2017; Voytek, 2017). In the field of environmental science, scientists particularly target the usage of social media to gather data for research, or to convey ideas and try to drive people's behaviors towards conservation (Toivonen et al., 2019; Wu et al., 2018). The new media contain many platforms for sharing information that by observation we can learn how certain topics are expressed. After understanding how these digital systems work in effective ways, they can be used as tools to make change to people's behaviors in the future.

This research aims to explore how connectedness to nature is expressed on the

new media, through the most basic and popular functions (services). The main purposes are to find out what Internet users tend to encounter within the contents of nature connection; to know the tendencies of popular shared information and possible trends of activities behind those information. What learned from these common approaches in the informal sources can benefit further research about connectedness to nature in the future. The method used in this research was text analysis. To support this method and provide more insights into the contents, qualitative reviews were also conducted. Theories about perception of nature and self in nature were also discussed in order to explore deeper into this fundamental yet magnificent relationship between human and nature.

1.2. Concepts

The concepts of what being "human" and "nature" vary in many discussions, and also within each person's perception. These two concepts and the connections between them have been the topic of discussion from the earliest time of human on Earth, and still remain as broad and exciting for modern people. Considering how broad the topic can be (as it should be), for the sake of clarity, major points are briefly introduced below. This paper does not solely focus on a single specific meaning of the terms, but aims to explore the possibility of integrating multiple facets into a holistic and feasible approach.

a/ Nature

The word "nature" can mean something quite specific at time, and also can represent something incomprehensible. Studies that involved dealing with the concept of "nature" often tried to specify the term in a narrow sense to avoid obscurity. However, if the studies use data containing information from participants, making sure that the researchers and the participants sharing the same specific meaning of such a broad concept of "nature" seems to be quite difficult. Similar to objectively existing and phenomena (commonly accepted), nature is experienced by us human through our perception, which is subjective. The perception also differs in each person, slightly or immensely (e.g. normal compared to certain disabled people). So "nature" can also be considered as a social construction (Thomas, 2014). While the meaning and interpretation we put on nature is so important, the diversity of how we give its meaning and interpret it caused a lot of arguments across studies (Cleary et al., 2017; Hartig, Mitchell, de Vries, & Frumkin, 2014). There are many way to categorize the interpretation

of nature, but the author presented below such categorization as relation to the position of perceived self.

Nature in the commonly used sense is, as defined by the online Oxford dictionary (2019), "The phenomena of the physical world collectively, including plants, animals, the landscape, and other features and products of the earth, as opposed to humans or human creations." This definition draws a clear line between that which belongs to humans and that which does not. Due to its clear meaning, this version of "nature" is widely used in scientific context. Phenomena are studied on the "nature" side alone, or in interactions with the "human" side. The phrase "human as part of nature" in this sense implies the similarity we share with nature in our systems and activities. Here we have the commonly known nature-human connection. The human body is the bridge into a broader meaning of nature. The human body and its functions are based on natural materials and follow all natural laws. Likewise, all human physical creations are formed by fundamental particles and follow fundamental laws. When considering these factors, the absolute "human" side of the division belongs to the non-material, mental phenomena. Nature is all material-based phenomena. This version of "nature" is used in the realm of philosophy and the study of psychology. The phrase "human as part of nature" is less metaphorical in this sense since human (partially nature) takes account for both their body (nature) and their mind (absolute human). Here we have the connections of mind-body and subject-object (internal-external). In the broadest sense possible, "nature" is everything ever exist regardless of human's ability to perceive. The human consciousness regardless of its origination belongs to this absolute whole. There is nothing with non-nature quality and thus, with nothing valid to be compared to, nature is absolute and incomprehensible. This version of "nature" appears in specific philosophical context. The phrase "human as part of nature" is completely literal, showing human as an element in this aggregate. Here the connection to nature is in a spiritual sense.

b/ Human

"Human as part of nature" is a phrase often discussed on many different aspects, being in everyday life, academic, artistic, or spiritual context. The other side in the relationship with nature is human. Although the factor "human" can be specified and standardized in studies based on clear objectively measurable data according to consensus, in studies based on subjective data (such as self-assessed statement) "human" is perceived differently in different people.

Because many studies on connectedness to nature rely on survey of people's opinions, it is important to acknowledge the difference in how people perceive what being human, especially themselves. Same with how one perceives nature, a person refers to oneself accordingly. "Human" can be viewed from one side of the duality, as partially integrated, or completely belonged to nature. The former is common in most people, while the latter is rarer (a speculation towards those with very strong degree of connectedness to nature). A person who does not experience other kind of perspective would find it difficult to understand that other perspective. The perception on self and nature of this specific population will be discussed in the Discussion section, as an attempt to evoke exploration into this unfamiliar area. Such exploration may lead to important insight which will benefit further research endeavors, especially towards improving our understanding about possible underlying mechanisms and hidden intrinsic values of connectedness to nature. It is also important for researchers to consider this separation in perspective regarding oneself, the human, and nature when interpreting other people's statements; since research in this field very often involves analyzing descriptions of subjective and abstract qualities from many individuals.

The human body is biological and a result of evolution within the biosphere. The long history of the human species is set to the adaptation with the surrounding natural environment. Very recently many people started to live in artificial urban environment. However the period is too short to make any significant permanent change to our genome. Thus biological instinct still influences various biological needs towards connecting with the natural world. For example, sunlight helps regulate nutrients and hormones in the body and can drive people to enjoy going outdoor. However, genetically encoded tendencies in humans are weak and depend on cognitive, affective and social conditions to be manifested (Kellert, 2008).Instinct-based behaviors in human as opposed to other animals are often complex, subtle, and can be overwhelmed by deliberate intentions. For example, people may prefer staying in-door and enjoy watching TV more than going outside despite beautiful sunny weather.

c/ Nature-human connection

Physical connection between human and nature refers to interactions of physical matter, which is objective; as opposed to how people perceive such interactions in "connectedness", which is subjective. In term of biology, this connection is manifested through the body structure, material exchange and transformation

down to the microscopic levels (e.g. respiration, digestion, immune system). In term of society, the connection can be found in every aspect, from production activities such as agriculture and manufacture industries to habitation and entertainment. Humanity is born from nature's complex evolution and needs the natural world for survival and life activities. This idea has been the norm from the beginning of civilization and considered obvious until recently when the advance in technological development allows some people to live in a very high degree of artificial environment. On the extreme, there are models of life in virtual reality, which requires minimal interaction with the physical world, or even complete oblivion to the "real world". With the current rate of technological advancement, in the near future this can become an actual choice rather than some fictional scenario. Environmental education always stresses the importance of protecting the natural environment to ensure human well-being. But what would happen when human existence is ensured by automated activities of machines? At the least, will advanced digital media replace more and more the act of experiencing nature? Further detailed discussions about the essence of the nature-human connection and the future of humanity are presented in Discussion section.

A paper by (Ives et al., 2017) was a review of 475 scientific articles (1984-2015) in a wide range of disciplines under the theme "human-nature connection". This included the concept of "connectedness to nature" and similar concepts of the same construct (see section below). This paper presented some important numerical results: increasing number of research (72.6% published from 2010 onwards), studied connection was cognitive (35.9%), experiential (22.0%), emotional (21.8%), philosophical (13.9%) and material (6.5%); methodological patterns were observed (87.8%) and experimental (12.2%). This paper also divided studies into 3 clusters with their associated epistemology: (human-nature connection as) Mind – objectivist, Place – constructionist, and Experience – subjectivist. What worth noticing from this study in particular and from scientific research in general is that clear division and categorization offer great clarity for analysis towards a specific goal – which similar different approach patterns among individuals or groups can also be seen in the informal sources; however the happening of connection to nature itself needs not advanced cognitive support nor presence of specific goals. For this reason, a certain interpretation can change its value when applied by one within the engagement of human-nature connection compared to observer applying to that same one.

Connectedness

Connectedness to nature refers to how a person perceives the natural world in relation with self, including reasoning and emotions. One can be aware or unaware of these thoughts and feelings. Stronger/weaker (more/less) connectedness should refer to the qualities of said thoughts and feelings, as positive/negative or close/far according to the position a person put oneself in relation to nature. For example, a person at the low end of the connectedness spectrum can be unaware of (oblivious) or have negative relationship with nature (e.g. feeling distaste for certain natural features). So where does this connectedness originate? The main statement in the concept of biophilia is that human's tendency to affiliate with natural systems and processes is inherent (Kellert, 2008). However the connectedness mechanism and expression are not obvious or straightforward, and there are also debates whether it is more of a natural occurrence or more of the result of active mental activities. Nevertheless, connectedness can develop from directly experiencing various aspects of nature, as well as from formal knowledge about the world. Connectedness to nature is recommended as an important part in environmental education for improving conservation behavior (C. M. Frantz & Mayer, 2014).

The concept "connectedness to nature" is expressed by different terms. Several researcher groups use different names to address the same construct examined in their original studies, though each one focused more on certain aspects of the construct (Tam, 2013a). Each term from the original studies came together with their original measuring scale. Many other following studies used one among the terms, determined by which scale applied. List of these concepts are presented below:

+ Commitment to nature (Davis, Green, & Reed, 2009)

+ Connectedness to nature (Mayer & Frantz, 2004)

+ Connectivity with nature (Dutcher, Finley, Luloff, & Johnson, 2007)

+ Emotional affinity toward nature (Kals, Schumacher, & Montada, 1999)

+ Environmental identity (Clayton, 2003)

+ Inclusion of nature in self (Schultz, 2002)

+ Nature relatedness (Nisbet, Zelenski, & Murphy, 2009)

In this research, the term "connectedness to nature" was chosen since the author thought it better fit the qualities of the concept. Regardless of term used, within the scope of discussions presented here the concept should have a broad and more open meaning (as re-defined above by author), without particularly aiming for any type of purpose (specific behavior). "Connectedness to nature" is chosen over a more general umbrella term such as "human-nature connection" in the paper of (Ives et al., 2017) to emphasize the subjective qualities of the matter.

Regarding the categorization of structures within the complex phenomenon of connectedness, it can be used to certain studies' advantage but can also hinder getting a holistic view. Especially in the higher end of the connectedness spectrum, borders between concepts and cause-effect relationships blend towards non-duality and thus need a corresponding integral perspective to precisely examine. For example, Schultz divided the inclusion with nature into cognitive, affective, and behavioral. The core of connectedness to nature was considered cognitive. The degree of inclusion and exclusion is a factor to predict environmental behaviors (Schultz, 2002). Other proposed concepts from other groups of researchers either share similar categorization or focus on one aspect among them (Tam, 2013a). This view of division is beneficial to studies with emphasis on the end results of commitment (pro-environmental behaviors) but may not as well suited to explore a more integral view of the whole process of human-nature connection or cases of special population. One distinct aspect of the clear division is one's own perception of self and nature; for it can be very different from the perspective of individual belonging to the extreme end of inclusion (e.g. the view of "doing" as part of the oneness of nature, implying the process is instantaneous).

2/ How connectedness to nature is studied

2.1 Scientific methods

Objective/Subjective in this section refers to whether the data in the study using a person's opinion or not (e.g. self-assessed questionnaire).

Within the relatively small number of studies that directly tackled the issue of connectedness to nature, very few used objective approach. Mainly this involves

description of observation, number counting and experiment. However, even if relatively more objective methods like these are used for data gathering, information from raw results must went through authors' interpretation to produce more meaningful discussions and conclusions. In other related fields (e.g. neuroscience), there are wider approach to create objective data and interpretation. Especially by utilizing machines to produce data (e.g. measuring brain activities), results are more precisely presented and narrowly interpreted. However, such studies found limitations in getting close to the qualities of connectedness which is intrinsically subjective. Survey or interviewing methods are popular when dealing with subjective targets like connectedness. Raw inputs are often quantified to present results in clear numerical ways. Whichever the data processing method, first assessment is made by a person's decision. Precise cause-effect relations and underlying reasons are often speculated and not tested. Testing appears to be difficult procedure as well. Additionally, the perception of "nature" and the self vary in each person, depending on multiple factors such as living environment, social condition, personal experience and personality. Major trends and correlations can be found but the mechanism of them would not be understood.

Ecological psychology is a relatively new perspective in psychology studying human-nature relationship that tries to create approaches suitable for explaining phenomena in an on-going real life environment. Researchers in this branch deem experiments in controlled laboratory environments are inadequate to study everyday life and encourage going outside the labs, leaving paper and pencil to have a more natural observation (Charles & Sommer, 2012). Although ecological psychology contributes to the theoretical understanding of human-nature relationship, many regard eco-psychologists as therapists rather than scientists due to their experiential approach (Schultz, 2002). But in the pursue of knowledge, even epistemic emotions in scientists play an important role through complex pathways that evolve together with the individuals as well as the scientific system (Kochan, 2013). Connectedness to nature is more of a challenging target of study the more we try to come close to the fundamental. However science is also constantly evolving and new exploratory approaches may provide clues for creating better ways, not only for analysis but also for knowing what else we should examine.

Measurement

Each concept of those presented above (Commitment to nature, Connectedness

to nature, Connectivity with nature, Emotional affinity toward nature, Environmental identity, Inclusion of nature in self, Nature relatedness) has their own measuring format. All of these measuring formats involve having participants (persons) show agreement to a number of statement, some also include diagrams besides statements (Tam, 2013a). Basing on participants' responses (self-evaluation), the measured value (depending on which format) will be set on the corresponding scale. This approach has its inherent limitation, which is unavoidable (as of now) but does not necessarily mean it cannot be utilized as advantage. There can be gaps between: values to be measured (connectedness) and statements (in survey) used to measure (is the aggregate of statement values equal to based concept value?); perception of each same concept in researchers and participants (also among individual within researcher and participant group) – which may lead to bigger gap when researcher interprets the result standing for participant's perception; existing qualities and aware qualities in participants – participants may not be fully aware of all their current thoughts and feelings towards the asked topics, which leads to inaccuracy. With careful scientific procedures, the effect of these limitations can be very small and subtle. Furthermore, it is these subtle gaps that drive theoretical arguments to deeper exploration of the based concept value. As newer research being conducted, it is often necessary to redefine concepts and develop new methods. Nevertheless it is an exciting possibility that the connectedness to nature we are able to measure currently is just part of a bigger and more holistic connectedness we have always been able to experience.

2.2 Other systems

a/ Philosophy

While examining the physical aspects of nature-human connection is the strength of modern natural science, the more subtle subjective side of the issue has been pondered upon for thousands of year. The severe impacts of climate change recently has brought to the academic world disciplines such as environmental ethics, considering the duty of the human species in the modern time context (Brennan & Lo, n.d.). In recent decades major Western views in environmental ethics varied from disregarding responsibility towards nature to responsibility from control position and responsibility due to nature's intrinsic values that humans are connected to (Schultz, 2002).

Contemplating about one's position in relation to the world is within the capacity

of everyone. Philosophy about man and nature is fundamental and is rooted in the foundations such as ontology and epistemology. While a person's view is probably most valued to self, well-constructed systems of thought influence many people or even how society is shaped. Philosophy of nature-human connection is touched by all great thinkers throughout history in the West and the East. It is also the great column in big religions' philosophy. In many schools of thought especially those of spirituality, the perception of this connection leads directly to behaviors in an obvious way rather than as two factors in a relationship (as seen in many studies where connectedness and behavior are tested for association). While a lot of contents within the philosophy realm cannot be studied empirically yet, they can provide special insights to build suitable approach for future endeavors. Speaking in another way, the human mind is able to examine deeply these qualities using the innate ability of thinking way before technology advancement allows us to make tangible examination.

Some major examples from our known early history are briefly presented here for the sake of introduction. To have a whole summary of this early time you may refer to the book "This Sacred Earth: Religion, Nature, Environment" (Gottlieb, 2003); to have a deep look into the matter you may visit the open online archive sacred-texts.com. In recent generations, the idea of a clear difference in philosophical view about nature between the West and the East (of the Earth) was not uncommon. While at the current time this is reduced to somewhat a stereotype as global open philosophical discussion and informal exchange of thought became more frequent, it still holds valuable information about human thought systems. Generally speaking, the stereotype is that towards nature, Western view is more analytical and rigid while Eastern view is more collective and flexible. Modern urban lifestyle (often be linked to the West) was criticized to be separated from nature and rely too much on artificial products. There was a time when Eastern thoughts were first introduced to the common people of Western modern world and were considered as quite strange or even "hippy" (late 20th century). In recent years, global environmental view has become more balanced between scientific advancement and natural connection in both sides of the globe. Actually, in early age of humanity, perspective towards nature in ancient civilizations or groups also shared considerable similarity. For the sake of being a brief introduction, 2 major perspectives are mentioned here. In ancient Europe, the antecedent form of an informal religion later to be known as Wicca worshiped many aspects of the natural world (e.g. forest, river, and mountain). Group chanting, praying, and meditation were some common practices. They also practiced primitive alchemy (e.g. with herbs and metal) which later evolved

into early medicine and chemistry. In ancient China, Taoism (often represented by Lao Tzu) suggested the best way to live is to live as naturally as possible. They believed true wisdom and enlightenment should be found within the most ordinary in life. Certain branches of Taoism practiced intensely both in alchemy (normal medicine and divine medicine) and with the mind (meditation and other exotic training). You may refer to a recent book "Opening the Dragon Gate: The Making of a Modern Taoist Wizard" (Chen, Zheng, & Cleary, 1996) for a closer view. The major point in both of these 2 thought systems is that they believed the highest form of being is the state of non-separation between the rough body and nature (physical) and the spirit (in both self and nature, sometimes referred to as soul and God); thus they practiced accordingly. Interestingly several similar points can also be found in modern mindfulness self-help books.

b/ Direct experience

There might be qualities of connectedness to nature even beyond the capacity of the mind. To many people, nature is awe, wonder, peace, spirituality and a higher dimension that they can connect to (Barlett, 2008). For example, nature lovers and practitioners in the fields of meditation or yoga often mention that there are special qualities of the connection to what is outside or beyond oneself that can only be perceived through direct experience. In most cases these direct perception does not even goes through "understanding", making interpretation and communication of the targets inaccurate. They suggest other people to directly experience it themselves. Such experiences are often reported by experienced individuals to be beneficial to one's physical and mental well-being on various levels. Many scientific studies have been performed to examine the effects of mindfulness (Barbaro & Pickett, 2016; Schutte & Malouff, 2018; Wang et al., 2016), and direct contacts with natural environment (see overview above) to both well-being and the level of connectedness to nature. However there still seem to be certain things possible to be known through experience but yet to be clearly identified and understood.

3/ Exploring new approach

Due to connectedness to nature being a multidisciplinary field of study, researchers can find ways to tackle the problems from different backgrounds as well as try to make a lead towards different applications. For example, recent efforts in improving the understanding of this complex issue includes exploring the effects of anthropomorphism of nature (Tam, Lee, & Chao, 2013) or empathy

with nature based on empathy with humans (Brown et al., 2019; Tam, 2013b). For example interestingly researchers found out that the way we often say "Mother Nature" is because people indeed associate nature with feminine characteristics and such anthropomorphism increases connectedness (Liu, Geng, Ye, & Zhou, 2019).

With the purpose of promoting nature conservation in mind, researchers also found novel integrations with other non-scientific fields. For example, art events aiming to increase pro-environmental behaviors as collaboration between scientists and artists were considered as an effective way (Opermanis, Kalnins, & Aunins, 2015). Underneath application are theories and mechanisms of such phenomena which often is the force that leads the way. Experiencing nature is not just one receiving direction. The yet to be explored mysterious influence of the human mind towards materials of the natural world was also initiated from many angles, including mind-body relationship (Radin, Hayssen, Emoto, & Kizu, 2006; Takimoto-Ohnishi, Ohnishi, & Murakami, 2012). In this approach, it is worth mentioning the recent strange discoveries with Mr. Wim Hof, opening many doors of possibility for health science research and application, especially in traditional biology and neurology (Muzik, Reilly, & Diwadkar, 2018).

Expression on the new media

This study aims to explore trends of expressions of the connection people have towards nature on the new media (the Internet). This area of informal sources of information is not yet to be examined carefully, but may provide hints to underlying tendencies in perception and behavior of people. This is reflected in two directions: those who share (upload) the contents on the Internet, and those who consume (encounter) such contents. Popularity and relevance of the contents in relation to the target concept (connectedness to nature) can be seen from both directions. These "top" (popular and relevant) contents reflect the strength of the corresponding expression tendencies. However it is important to notice that the appearance of "top" contents is controlled and determined by algorithm, in this case by the artificial intelligence of Google corporate (Youtube is owned by Google). Though the concept of connectedness to nature is much less likely to be influenced by the financial market as in products, which in turn leads to a more "neutral" search result and recommendation; it is undeniable that the digital information is controlled by the service providing companies to some degree no matter how small. This matter is in itself a natural limitation for research done in the informal information sources especially the new media, but

information are well-known for most global general Internet users (while some other major platforms are well-known only among certain group and thus deemed unsuitable for this study). 3 types of sources were examined in this paper: brief information in search result page (Google), videos (Youtube), and articles (blogs). Although each person uses these platforms for different purposes in their daily life, they are also the go-to places when those people need information about some specific things. Also for clarity sake, comparison was only done for the word use patterns between blogs and academic articles and not for other samples.

a) Internet search engine

Data

Search was conducted on Google search service using web browser Google Chrome in incognito mode. Depersonalization practices were ensured to keep preferences by tracking to minimum. However due to the nature of Google search service, some forms of tracking are unavoidable (e.g. localization), including possible hidden tracking activities if any. For this reason, same search was conducted on DuckDuckGo which is a popular search service especially in claiming to aim for being neutral with no tracking. All other settings were kept as default to avoid bias and control. The aim of this test is to see what normal people likely encounter when doing such search, as well as what contents are chosen as most popular and relevant by the search engine. Search keyword was "nature connection", chosen as most common using Google trends (https://trends.google.com/trends/explore) to check many similar words throughout history. Results set to be in English. All words appeared on the search result pages were collected (to avoid confusion, this is the visible text on the result pages, not text of website after clicking links). For each engine (Google and DuckDuckGo), raw result contained approximately 15,000 words from about 500 results as default for maximum displayed results.

Reason

The Internet plays a crucial role in the modern world and will likely to become even more important as time goes on. As of April 2019 there were approximately 4.4 billion active Internet users globally; by December 2017, English accounted for 25.4% of Internet users, and was the most common language used on the Internet (statista.com). However not all contents on the Internet are equally accessed by users. Contents that have more traffic are likely to gain even more

traction due to the algorithm of search engines. People searching for information on the Internet commonly use the services of search engines. Google is the most commonly used search engine with a dominant (over) 90% share of global search engine usage (statista.com). There are about 3.5 billion searches made through Google every day (Internetlivestats.com). Knowing what the most popular search results are not only shows what being most visible to searchers, but also shows which actions currently most done in the searched field. In the case of this research, it shows which contents people may encounter while searching for nature connection, as well as the most popular related information and activities determined by Google's algorithm.

According to many different informal sources on the Internet, the first page of Google search result (10 results by default) receives about 90-95% traffic. However, Google search results vary greatly depending on online activity history, set references, geographical location, chosen language, and time. The sample used in this research thus included a wide range of results to counter this variance instead of just focusing on the first page. Regarding the value of the sample over time, while contents on the Internet are usually stored for the future, new contents, trends, and changes in search algorithm are also added continuously. Popular contents may be very different years (or even months often in cases of big events) from when this sample was collected. This is a common limitation when it comes to research on the Internet's contents.

b) Internet video platform

Data

Search was conducted on Youtube using web browser Google Chrome in incognito mode. Since Youtube also uses tracking to provide relevant videos to individuals, depersonalization practices were ensured. All other settings were kept as default. Keyword was "nature connection". Sorting was on default which is by relevance without any further specification. All results were in English. Transcripts from 100 first videos were collected. Some were transcripts submitted by translators; others are auto-generated (Youtube automatic speech to text feature); a few videos were without speech so there was no text. Raw result contained approximately 150,000 words. Sample included videos of both non-professional and professional varieties, length ranging from several minutes to several hours, and view count ranging from under 100 to over 1 million.

Reason

Video is an effective way to share information on the Internet, combining various types of visuals and sounds, and often also including text. Youtube is generally considered the most popular video website, with 1.47 billion users in 2017 and still growing rapidly (statista.com). Users can upload and view videos on this platform. Videos can range from non-professional and personal recordings to professional and expensive products. Youtube's algorithm determines what contents being recommended to viewers and their order of appearance both from home pages and search result pages. Many factors can affect this process, such as relevance, subscription (bookmarking/ following), viewing history, current trending, and number of view of the videos. Similar to Google's, Youtube's algorithm is complex and continuously being developed. New contents are also added constantly as the nature of a living online platform. Youtube search results reflects what contents being automatically recommended to viewers (which are considered relevant and popular), and what contents users tend to upload (which shows corresponding activities or behaviors). This is quite similar to Google; however in Youtube's case, users' activities have relatively more direct impacts due to it being a platform with social features (such as interactions between users). In the scope of this research, mentioned aspects of nature connection can be examined. Also because the contents are directly linked to people's behaviors, it can shed some light on how people naturally express their connectedness to nature.

Regarding auto-generated text-to-speech feature on Youtube (used to make captions in absence of real-human's transcription), though being improved regularly, the AI still produce text with considerable inaccuracy. This leads to false meaning in cases from sentences containing inaccurately transcribed words. If viewers rely on captions in these cases they may misunderstand those parts (Parton, 2016). However when processed by text analysis software, single word is likely to have less impact on data result compared to being read by real humans to create meaning, through context pathway. Also it is worth noticing that Youtube algorithm heavily rely on this auto-generated transcript to evaluate videos' contents (as real-human transcription is usually only available for few popular videos among the huge number of total videos on the platform). So in a way, this inaccuracy is included in the system as it is when considering the whole or the end result of the processes. Another important point about auto-generated transcription is that it does not have the ability to create sentences (no period but rather only continuous words). For this reason it can hinder some functions during analysis compared to processing normal text. Further research is needed to find better ways of processing this kind of data.

articles, containing approximately 80 000 words.

Reason

While (Ives et al., 2017) did an extensive review on the matter of nature-human connection, the sample in this study was much smaller yet contained papers focusing more on the subjective aspects of the concept. Same analysis method use as for the informal source samples also presents better comparison in word cluster structure. The main purpose of analyzing the formal source in this paper is not to find out detailed features in their contents (as they were presented in other review studies before as introduced above) but to look at the conceptualizing structure of typical academic research through the expression from raw text.

2. Data analysis

One sample of each source is in pure text form in a single .txt file (one file including multiple units' contents). Raw data (5 samples as described above) were simply preprocessed and then analyzed using software KH-coder (version 3.Alpha.15) developed by Koichi Higuchi. The software can be used for analyzing various types of literature. While among test analysis applications (software), there are some more specialized for working with academic journal article format, this one is more suitable for working with general text which were the samples of informal sources.

Three main operations were used: word frequency, multi-dimensional scaling and co-occurrence network. Word frequency testing is a basic analysis for knowing the appearance frequency of words (and ranking) within the samples in term of exact number. Multi-dimensional scaling provides visualization of word appearance by patterns and groups on multidimensional space (2 or 3 axes). Filtering is applied to minimum term frequency at the default (recommended) value according to the sample size to avoid overcrowding in visual presentation. Thus the visual presentations contained top frequent words (or word groups). Proper Nouns were excluded. Raw results were examined in Microsoft Excel files and several summarized points of interest are presented in the Result section. Multi-dimensional scaling method used was Kruskal method for 2-dimensional scaling. Words were grouped by relevance determined by the software's built-in algorithm and probability of word appearance in original text was displayed through 2-dimensional distance between word bubbles (see figures). Words close together in displayed figures were more likely to appear as

close relatively in original text. Co-occurrence network operation provides diagram showing connections between words (or word groups) with similar appearance patterns and presents clear co-occurrence structures compared to Multi-dimensional scaling. More relevance words were displayed by connecting lines between bubbles, showing clearer connections compared to those viewed by distance on 2-dimensional plane.

Additional qualitative reviews

To support quantitative analysis, extensive qualitative reviews were done over many types of material from the informal sources, especially focusing on the subjective aspects. Materials included those in the chosen platforms as above (website, video, blog), but contents were deliberately selected by topics of interest - those which needed to be clarified more based on quantitative analysis results. This can provide more insight into people's thoughts and beliefs related to the target concept. It also aids the understanding of the author, which the author believed to be of great value when dealing with a target concept with such emphasis on subjectivity. Interpretation from this qualitative approach should be treated as additional information. They are speculation and may evoke different perspectives when examining the matter.

Result

1. Word frequency

Word groups (by theme) of interest are presented below from 4 samples (Google, DuckDuckGo, Youtube, Internet blogs). Terms are followed by number of appearance (1 to 4) in sample(s) in rank<100 (top 100 frequent) in bracket [ ]. Terms expressing same target is treated as one item (e.g. child/children and kid/kids). Higher number means the term is present in more sources (Internet major service/platform) as a popular term.

_ Children: children [4]; family [3]; youth [2]; student [1];

_ Community: community [4]; school [2]; organization [1]; group [4]; social [3]; share [2]

_ Natural feature: forest [4]; Earth [3]; Sun [1]; tree [3]; animal [1]; bird [2]; water [1]

_ Perception: experience [3]; feel/feeling [3]; awareness [1]; fun [2]; relationship [3]; enjoy [1]; sense [2]; emotion [2]; happiness [1]; love [1]; beautiful [2]

_ Basic action: learn [4]; think [3]; walk [1]; look [2]; say [2]; listen [2]; sit [1]; work [3]; grow [3]

Additional notes about these points:

_ Information related to children and community was present on many basic services, qualitative reviews suggested that this was due to many conducted events involving children together or with family members in schools, local areas or individual family trips to nature. They can be programs from organizations or informal gathering. Search engine services especially tend to show such programs.

_ Among many popular natural features of landscape such as forest, mountain, ocean, desert, forest seemed to be mentioned more when people generally relate to connection the nature. Accordingly, tree was more popular than other features like animal, rock or water. The Earth as a whole was also mentioned often. Among animals, birds seemed to be more relatable, likely linked to the action of "listen" or "hear".

_ Experiencing nature was expressed through both direct pathways (person and something) and indirect pathways (person and emotions or thoughts). Another interesting point is about the term "grow" which often appeared in high frequency. Its meaning can be related to plants (a tree grows or to grow a tree) but qualitative reviews also suggested that "grow" often refers to mental development of a person (through experiencing nature).

2. Appearance pattern

Besides the visual presentation of the results below, the author also gave summary points and interpretation (with support from qualitative reviews).

a/ Search engine

Google:

Duckduckgo:

Contents included more practical programs, events, organizations, places, activities, communities rather than concepts, theories, discussions. While searching for nature connection, users would likely to encounter information about related actual activities more than information about the target concept itself. This fits the theme of concept diversity and direct experience over conceptual one. There were also recognizable differences between results from Google and DuckDuckGo services. Influences on organic search result should be considered. Future deeper research may be necessary. Influenced or not, it is the results normal people would likely encounter, especially with the popularity of Google search service.

b/ Video platform (Youtube)

There were many common actions like "feel, walk, sit, see, watch, hear, think, say" revolving around the main topic; which again focusing on direct experiences rather than discussions. Qualitative reviews suggested that Youtube videos of this topic often involved real people talking in real time rather than pre-scripted text showed on video background (the latter is not uncommon regarding videos about nature-based concepts).

<u>c/ Internet blogs</u>

Co-occurrence network:

These sections were popular and linked together: group activities (together with someone else), direct experiences; focusing on mental, emotional aspects (e.g. feelings, stress relief); a lot of description (objects, time, space, and persons). Qualitative reviews suggested there are two major types of this kind of blogs: one focusing on describing a past event that the author participated, and one focusing on expressing the author's opinion on a related abstract matter or a past event. Events involving children were quite common. Another interesting point is that the cluster of main concept (e.g. nature) is grouped together with the cluster of result (e.g. benefit). Qualitative reviews suggested that it was due to there being no emphasis on cause-effect relation in the structure of their writing.

d/ Academic journal articles

Co-occurrence network:

Results of Internet blogs and academic journal article were also presented through co-occurrence network for easier visualization of word connection structures. These two samples were relatively similar in writing format (compared to Google search result page for example) and thus the results can be viewed side by side.

Due to small sample size, the result of journal article should not be reflected focusing on the contents but rather for the purpose of getting an overview of the structure of presentation. Regarding the same point as mentioned above in the blog section, cluster of concept (e.g. nature, connectedness) is more clearly separated with cluster of result (e.g. behavior). This may reflected the logical structure used in scientific writing.

General focus points:

+ Informal sources: words are either neutral or positive (nature and its connection are generally viewed as a good thing); many active and common actions (normal everyday-life actions of a human rather than involving more advanced forms of cognition); often involving children (e.g. events for children, observation, advice, parenting).

Regarding formed structure, this can be seen in blogs, since samples from other platforms (search result and video transcript) are not suitable for examining structure. Points of interest: Word connection is based more on simple context (word type, sentence); Clusters are unorganized, often random and scattered. The reason can be informal writing style, writing quality and can also be from thought structure regarding connectedness to nature in normal situations. For example, from the reason for this thought pattern, it is quite important to consider the perspective of regarding the connection to nature as something obvious/ natural and does not require deep reasoning like explanation or causal relation. Information presented thus focused more on the qualities of the phenomena themselves such as certain activity. The randomness in word group structure may be due to this descriptive style of information.

+ Formal sources: including measurement; having clear group division between [connection to nature] and [behavior], or other pair of one driving factor and one result -this is mainly due to academic writing structures and purposes. By contrast, in informal articles, any written issue needs not lead to anything else.

Word connection is based more on complex structure (overall theme).

Discussion

1. Nature connectedness in children

Regarding word frequency, words related to "children" often appeared at high frequency (top 10 in samples). When doing qualitative reviews for activities related to word groups, a big proportion involved children, suggesting that the information on the New media reflected what parents and adults do for/ with the children (e.g. organizing field trips, talking about kids playing in nature). It is unlikely that the children themselves upload such information, thus this showed how adults and communities care about the connection between the young generation and nature.

a/ Nature and children

As showed in the result, information related to children often went together with nature connection, likely reflecting two types of occurrence: people often care for children's connection to nature and provide according activities; children often have stronger connectedness to nature or conditions that lead to such quality. This section discusses studies and speculations surrounding this matter.

Creating a good relationship with nature is important in children. Environmental education often emphasizes the effectiveness of programs for children as well as the need for such programs integrated in school curriculum. Nature-based education that fosters both environmental knowledge and connectedness to nature can improve children's ecological behavior (Otto & Pensini, 2017). Even simply the degree of greenness in the neighborhood can affect children's behavior (Lee, Kim, & Ha, 2019). However, children of the new generations especially in urban environment have less opportunity to come in contact with the natural world. Disconnection with nature usually gives the image of lacking outdoor physical activities in natural environment. It is a dangerous situation of the modern world since long period of staying indoor and watching screen of electronic devices can affect language and cognitive development in children (Jusoff & Sahimi, 2009). Although consuming information about nature on the new media (such as pictures, videos and knowledge) is considered one type of

indirect way to experience nature, there is high risk in case of applying on children. When children's major experience of nature is through electronic media, they are more likely to develop negative feelings (such as dislike or fear) and misconceptions compared to experiencing through real contact (Cohen & Horm-Wingerd, 1993). So ironically, maybe the new media is where adults can benefit from its great network and information to provide our children with better opportunities of actual real contact with nature.

From the perspective of adults, childhood experience has a special position in connecting with nature. Keywords associated with childhood experience of nature were such as: joyful, serene, ecstatic, holy, timeless, peaceful; Many also expressed the feeling of awe and being attracted in presence of nature (Sheldrake, 2018). There are several dimensions in children's connection to nature: enjoyment, sympathy, sense of oneness and responsibility (Cheng & Monroe, 2012). A review of many recent scientific papers showed that attitude towards nature in adults is significantly influenced by their childhood experience, and such experience leads to more nature-based activities and caring for nature as adults (Mustapa, Maliki, & Hamzah, 2015). This review also showed the benefits of nature in multiple aspects of children's development needs from many studies, categorized into: cognitive, physical, emotional, social, and spiritual. Childhood is a special phase in life especially for the establishment of health-related behavior (Warschburger, 2015), so it is important not only to concern for our children's nature experience, but also to look into each of our own psychological world of childhood to re-explore, and in some case find a way to heal the relationship we have with nature.

Children and nature in the modern age

In the book "Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder" (Louv, 2010), Richard Louv described the experience of parents and adults seeing their children becoming more and more detached to the natural world. He also described in detail the experience of children and adults experiencing nature, often from their own perspectives. Even nature contact in the modern world seemed unnatural (e.g. zoo visit) or even perceived as fearful. He introduced the term "nature-deficit disorder" to address the lack of values of nature and all of its important benefits in the life of the new young generations. Adults spending their own childhood in the richness of nature experience ought to reflect on their past and think about the future – their children in the current environment. However complicated matters are not for small children to digest but for adults as a society to solve. There should be no forcing and the children

should be provided the right environment and opportunities to explore that richness themselves – just naturally as their parents once did. Similar to what being discussed in this paper, it is the responsibility and action of parents to show the children the connection they want to make with nature.

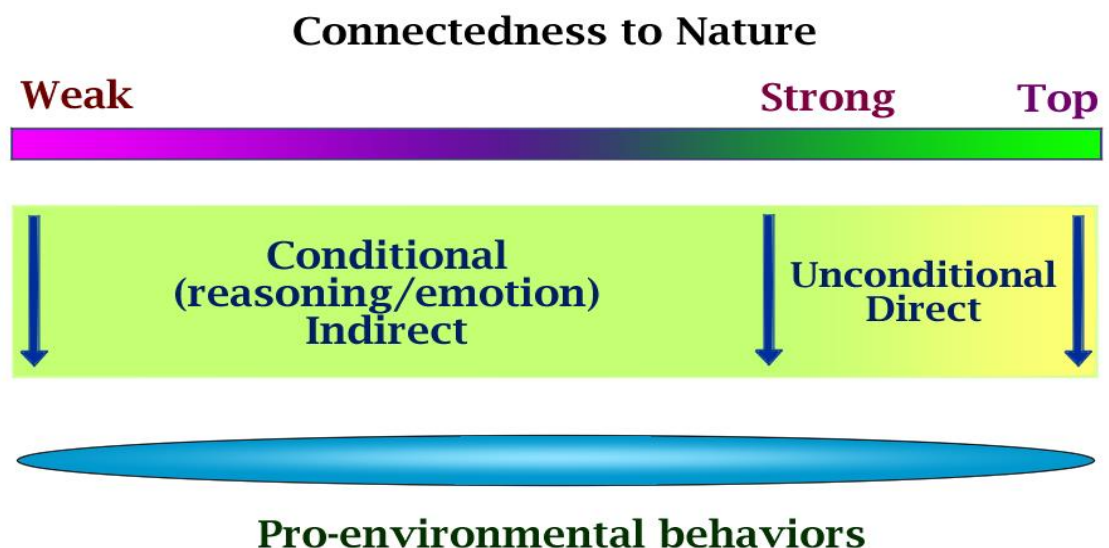## b/ Connection to nature: Children and the community

Result from analysis suggested that appearance pattern of information related to children also linked to community activities (e.g. group, family, school, and friends). Qualitative reviews confirmed that indeed it is often the case in information about popular nature-based activities on the Internet. Social circles have complex effects on children's emotion expression (Lindsey & Berks, 2019). Pro-social and pro-environmental aspects may linked with each other, for example nature school can evoke emotions and have benefits for behavior of both aspects in children (Dopko, Capaldi, & Zelenski, 2019). As mentioned in the sub-section above, the Internet and modern personal electronic devices greatly help people to find or create information. Organizing a nature-based group event is easier and children as well as their families, friend circles or schools can benefit from it. If used properly the new media will act as the technology that connects not only between people and nature but also among people as well. Such group activities in nature remind ourselves that we humans are living beings, and a social species; and thus we can benefit from being with nature and being with our fellow people. This is especially important for children of the new generations since many are growing up in artificial urban environment and lacking close social activities (which again ironically over-dependence on the new media is to be blamed for).

2. Specific perception of nature

a/ Unconditional relationship

Direct, authentic experience and a simple, straightforward approach to experiencing nature were quite often expressed in informal sources. It can be seen in the result through the frequent use of active verbs describing simple action in nature or towards nature; while their appearance tends to go with

description of natural features, and also often linked to emotions. The value of real contact with nature was also mentioned before in this paper. The problems of self-awareness and self-identity in connectedness to nature and environmental behavior were studied through the means of survey (C. Frantz et al., 2005; Lokhorst, Hoon, le Rutte, & de Snoo, 2014). However it is still an issue for debate due to its inherent subjectivity. During qualitative reviews in this research, the author found a special type of expression in certain people that may help explain issues revolving the perception of self and the tendency of direct experience. It should be emphasized that this is a speculation and requires further studies in order to clarify. The findings were that a specific population of people with very strong connectedness to nature (often self-identified as nature lover or deeply spiritually connected to nature) perceived their connectedness as naturally obvious and the natural world as integrated with their self-image. They viewed pro-environmental behavior as the result of unconditional motivation (or we can say natural process). In other word, they would do good for nature without the motive of personal reason or emotion – which are the drive factors often examined in studies on connectedness to nature for environmental behavior. Spiritual attitude is not necessarily present, but it is often the case that these people referred to nature as something more than the normal level of perception - something sacred. They usually advocated direct contact with nature as a non-alternative way to fully understand it and described the feeling of an oneness state of being (together with nature). The same patterns also sometimes appeared in other sources of discussion as presented above. Maybe this specific perception can give hints to deeper level of mechanism on connectedness to nature. Relevant discussions to this matter are presented in sub-section (b) and (c) below.

Connectedness to Nature

Weak — Strong — Top

Conditional (reasoning/emotion) Indirect — **Unconditional Direct**

Pro-environmental behaviors

b/ The root of connectedness

Consciousness should be an important theme in discussion revolving connectedness to nature. Reasons for this choice is the speculation that the nature of human consciousness (qualities of consciousness), together with individual perception of oneself determine how one thinks and feels about the connection with the natural world. In non-academic situations, consciousness is often an emphasis regarding people trying to connect to nature. In spiritual context, connecting oneself to nature is taken seriously and as fundamental understanding and practices. Although deemed difficult to be examined using normal academic practices, the issue of consciousness in connectedness to nature holds special significances not only as a scientific study but also as an invitation to the exploration of oneself. Probably the closest way one can examine the qualities of consciousness is through the state of being mindful. Mindfulness – being aware non-judgmentally of what is happening in the moment, both inside (one's mind and body) and outside – was found in many studies to have association with connectedness to nature (Schutte & Malouff, 2018).

Major theories about the qualities of consciousness can be roughly divided into: (a) results of physical phenomena and (b) unique intrinsic values. The case of (a) assumes the perception of one's own consciousness is an illusion-like construct resulting from activities within the brain (thus consciousness itself holds no intrinsic value). The case of (b) assumes consciousness holds unique non-material qualities which are fundamentally different from physical phenomena and yet to be clearly defined. In both case, it can be further divided into: (1) consciousness only exist in human and highly complex animals and (2) consciousness can be in multiple forms and co-exist with various physical phenomena. How a person be aware of his/her own self in relation to what of non-self (ontological aspect) as well as how he/she perceive (know, think and feel about) that of non-self (epistemological aspect) are the foundation of more practical levels (e.g. connectedness to nature or ecological behavior). Since study of connectedness to nature deals with two very fundamental factors in the relationship that is human (self in each individual) and nature (that of non-self or more commonly, that of what non-man-made), a concrete foundation of consciousness understanding is necessary.

More about the dual reasoning/emotion quality of connectedness to nature, there is some speculation. If people do not feel emotionally connected to nature, their behaviors are likely dominantly decided by personal reasoning. This can go

both ways as it may lead to harmful behaviors towards the natural environment if underlying motive is bad (e.g. selfishness or greed can lead to overly using natural resources for profit); on the other hand positive reasoning can also lead to pro-environmental behaviors. If people feel emotionally connected to nature, such emotions can influence their behaviors and may even bypass personal reasoning. For example, nature lovers sometimes report to find doing harm to the environment ridiculous and not negotiable. Strong positive emotions and beliefs can become the support to greatly benefit pro-environmental projects especially in environmental education. However there are also cases of negative emotional relationship when negative feelings towards nature (e.g. from being accustomed to living in artificial environment) affect behaviors. For example: people who prefer artificial scenery may replace their house's natural garden with artificial platforms and decorations. Further deep qualitative research of specific groups can be very beneficial to our overall understanding of the matter. Example of such groups can be: those that base their environmental behavior on reasoning dominantly; those that base on emotion dominantly; and also those that do not aware why they decide to carry out pro-environmental behavior (e.g. just do it for the trend).

c/ Nature as the Sacred

Many environmentalists wrote about the alienation from nature of modern societies. While most associated the alienation with changes in living environment and technological advancement in a manner of inevitable, large-scale, auto-pilot way; some also mentioned the roles of active, intentional, personal pursue whether it is cognitive, emotional or even spiritual. In the early time of human civilizations, simpler structures of spirituality played an important role in human social life. Multiple aspects of the natural world were considered sacred. They might be worshiped for assistance, or out of fear. This can be called primal sacred, which was dominated by another form of sacralization – monotheistic sacred, that is present in many major religions until the modern time (Szerszynski, 2005).

From the age of industrial revolution, secularization became a famous topic not only in religion studies but also in environmental fields. Among famous thinkers, Max Weber had strong influence towards the studies of desacralization tendency in the world, which further popularized the term disenchantment (Grosby, 2013).

In the scientific, industrial new world, nature is mathematical, mechanical, and treated as a resource (Szerszynski, 2005). The natural world became devoid of the sacred; the unknown is a rather complicated calculation instead of miracle, mystery and awe. A natural world full of magic seems like the worldview of children in comparison; and by no surprise, it tends to be what children often experience as discussed above. However, it is not to say that secularization is necessarily bad for behaviors towards the environment. Besides serving the needs of a clear, objective, mechanical target in natural science practices, it can also benefit policy making processes for environmental purposes as well. A worldview style or school of thought does not directly translate into certain behaviors, but should rather be concerned about where it would shine. For example, ecosystem services being incorporated into the economy though having the risk of nature commodification, was still considered to be beneficial for environmental governance (Martin-Ortega, Mesa-Jurado, Pineda-Vazquez, & Novo, 2019).

The sacred of nature does not necessarily relate to structural spirituality such as religions. The worldview can be the expression of a fundamental belief system. This belief system is derived from and affected by various degrees of cognition and possibly other unknown factors. Rupert Sheldrake, a biologist that had done multidisciplinary research focusing on spirituality for many decades, discussed the reconnection with the so-called more-than-human world in his book Science and Spiritual practices (Sheldrake, 2018). Sheldrake discussed the issue of scientific knowledge especially biology, which aims to study the natural world, not being based on direct experience but rather distant, removed, or even involving killing living species for experiments. For this reason, some people expressed the split between the view of nature through education and what being directly experience especially during childhood. Sheldrake also discussed the detachment of the holy from nature throughout history, mostly with recent science advancement. Absolute materialism faces many difficult problems when addressing nature, not only for philosophers but also for practical scientists. Among the search for solutions, new philosophers used the term panpsychism to express the existence of "mental" qualities in all material in the universe. More complex systems hold more complex forms of these qualities; indicating consciousness is based on degree as opposed to on category. This is not necessarily a new concept since ancient philosophers in different cultures already mentioned the same structure (animism).

Sheldrake's ideas shared a lot of similarity with the interpretations of many

modern spiritual people belonged to pantheism and panentheism view. They often refer to nature as normal but holy, external but sharing the same level as humans. Some put consciousness above the phenomenality (the world as we perceive) and make clear distinction between this consciousness and the ego which contains cognition. Based on such worldview, these people consider connecting with nature to be an obvious and inherent process, being at the same level with other natural processes in the universe. However the main difference between this view and that of biophilia is that this is unconditional while biophilia is based on possible biological and cognitive mechanism. For the sake of imagining this particular view of obviousness, one can consider the following example: a base event does not question the existence of itself; because if the value is false, there is no existing event to carry out the questioning activity. In the above case, consciousness (human), nature (the universe) and their connection are all put at the base level. It is the same as how we view our own existence and the existence of the world we live in, but with addition of the connection to nature (as how an existing hand is obviously attached to the existing arm and both belonging to the same level – the body). Therefore, people having this worldview do not engage in arguments about their connectedness to nature because to them this cannot be a topic of discussion. This leads to difficulty when studying their thoughts and behaviors using traditional methods. Also for the same reason, people with this worldview often say to others that nature can only be understood through direct experience and not words.

3. Human and nature on the way to the future

The world is changing rapidly from all angles: ecology, economy, technology, society and more. The changes sometimes seem so fast (and it is getting even faster) that to know and to act also become increasingly difficult, even confusing at times. The faster the science system becomes the more problems are present. We still struggle to understand our oldest friend that has been here since forever and will be here for incomprehensible amount of time into the future: Nature. Our relationship is getting more and more complicated, while our perception of the relationship also gains in complexity. Standing before serious risks of ecological destruction, more than ever we need to heal this relationship; for nature is the one that helps us survive and thrive, and keeps surprising us every time we learn more about how it does. But modernity also comes with great technological advantage. With the new media, information can be easily accessed, created,

and shared by so many people around the world. Knowing how normal people tend to express their various degrees and forms of connectedness to nature on the Internet can help scientists in many ways, from theoretical to behavioral studies. With the current state of global development, the new media will not go away but evolve extremely rapidly and powerfully. Will this powerful tool improve the quality of our connection to nature, or will it slowly replace our contact with the real, natural world? Humanity themselves need to decide, as human is one side of this two-side relationship.

The media has been studied from its older days (such as radio and television) to assess the effects on (multiple aspects of) human wellbeing upon usage. The world population especially in more developed countries has become increasingly dependent on media usage, and now predominantly the New media forms (such as though the Internet and social media platforms). New smart devices like smartphones have helped accessing the network and online contents easier with each innovation coming. Among the general population, special concern is put on the young – children and adolescents, who were born into the modern world and at risk of becoming dependent on the New media and their devices without even realizing it. Parents now even let their infants and toddlers use mobile media (Levine, Waite, Bowman, & Kachinsky, 2019). Many among the younger generations often view spending hours on their smartphones everyday a norm in the new society. Older form of the media – television was found to have negative effects on children and adolescent mental wellbeing upon excessive usage (McAnally, Young, & Hancox, 2019). As for the new form of media (digital), it was also found to have negative effects on children wellbeing (Bruggeman, Van Hiel, Van Hal, & Van Dongen, 2019).

As dependence on the digital world increases, digital representation may also slowly replace the real one. Such tendency can already be observed in virtual services, for example traveling, playing "outdoor", interacting with friends (online avatar), and learning natural features (like geology and biology class) through the virtual world. Virtual technology is rapidly developing and its potential is truly considerable, even to the point of restructuring society's education, labour, and entertainment systems. And with its developing speed and huge support from hardware innovation, this may not be a very far future, but rather coming quite soon unexpectedly. If that is the case, the problem would become more of a philosophical question about reality, existence, and perception. If the artificial reality becomes powerful enough (for example being integrated into our biological functions), will it completely replace the real nature? For if the children

of future are born into such artificial reality and do not come into contact with the "raw" reality, will they ever realize the difference? Some thinkers at the current time believe this might indeed be the direction of our civilization, to simulate our own reality. Some even expressed the possibility that we are already in a simulated one created by our precedent highly developed civilization. So can humanity really be able to choose its "nature"? Would an artificially augmented body benefit from the artificial world in the same way our biological bodies benefit from being with Nature? Again, technology is moving fast and maybe before we could figure these thoughts out in our minds, human society would already change too much.

Another point about the New media worth considering is the fact that contents on the most popular online services of the global Internet is to certain degree influenced by the service providers. Artificial intelligence (AI) is used to manage the systems (clearly seen in the case of Google search and Youtube recommendation algorithm). And it is unlikely that the whole process is completely objective and free of intervention. This is unfortunately the reality of current Internet society, and although the information presented can be seen as more "real" than in controlled lab environment, this as well is not free of all active control. It is a new challenge for studying social phenomena in the modern and digital world. In the end, to get close to the "nature of Nature", maybe we already all hold the best tools possible: our mind, our body, and our consciousness; for they are the reason we perceive any and every aspects of the relationship, from the beginning, and until the end. Let us just hope that we will make the right choice, so that humanity will not leave early and will stay with ever-present Nature.

Conclusion – Limitation – Recommendation

Nature has been known to have positive effects on human wellbeing. This was again and again found to be true through scientific studies from many different angles. The more subjective side of our relationship to nature is connectedness to nature. In this modern age, the question of how people think and feel about their connection to nature can be explored through information on the New media. Text mining and analysis were performed on data from popular Internet platforms: search service (Google search), video (Youtube) and online articles (blogs) with interpretation support from extensive qualitative reviews. Although the data and results can be analyzed and interpreted in many ways, the author presented those related to the main topic of this study. Informal sources of the

new media generally shared some major images about human's connection to nature: positive effects of experiencing nature, the children and community, and a focus on direct experience of nature. People's connectedness was often expressed directly through activities. Two major points were considered important and should be elaborated in further studies: children's connectedness to nature and perception of nature which involves direct experience of/ contact with nature. The use of digital media for accessing and sharing information about real nature experience as well as a different perspective on perception of self in nature should be considered in relation with humanity's development process.

This exploratory study had several limitations: It was the first attempt to apply text analysis on mentioned online services about the topic of human-nature connection, thus the method and procedure need to be improved; The rapid change in online trending contents and possible downsides as mentioned about the management by artificial intelligence; Bigger samples with more variety over long period is desirable.

On these limitations, some recommendations are presented for further research in this field: Analysis of information - sampling method and text analysis method should be improved or replaced by more suitable ones; Scope of study: collecting samples from different points in time can help revealing changes in tendencies; Besides text target can be images, videos (whole), or even related products; specific groups with likely higher connectedness to nature should be studied closely (e.g. "animal whisperers", proficient yogi and monks, indigenous tribal people).

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