

Case Studies and how They Helped Develop the Field of Psychology

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ABSTRACT

A case study is a research methodology that is utilized to gain knowledge and study a topic in a systematic and in-depth manner. Case studies are often resorted to when there is a unique case, or a theory cannot be researched in a laboratory setting. Multiple case studies have been discovered and studied across the field of psychology. This paper aims to establish a thorough understanding of these well-established case studies and highlight the importance that they had on the development of the field of psychology by reviewing multiple sets of literature. With psychology being an interdisciplinary field of study, highlighting the importance and benefits of these case studies which can help bridge the gap and link different domains. In conclusion, case studies remain a highly critical part of research in psychology and have proved to further develop the knowledge in the domain of psychology since the very beginning and will continue to do so.

Keywords: Case studies, Psychology, Interdisciplinary, Research methodology

Psychology is defined as the scientific study of mental states and behavior in individuals and animals. It explores the inner workings of mental states, and how they get influenced by multiple factors such as biology, environment, social situations, and so on, and in turn influence behaviors. Psychology is a multidisciplinary subject and branches out into various fields (McLeod, S, 2023). The roots of psychology can be tracked back to early Greek philosophy from which a subfield emerged, known as psychology.

The early days of psychology led to the emergence of a multitude of theories that attempted to explain behavior, personality, mental processes, etc. in unique ways. Wilhelm Wundt is the father of psychology because he “separated psychology from philosophy by analyzing the workings of the mind in a more structured way, with the emphasis being on objective measurement and control” (McLeod, S, 2023) Four basic goals of psychology have been established; describe, explain, predict and change mental processes and the subsequent behavior. Psychology was established as a scientific discipline when Wundt opened the first psychological laboratory in 1879, in *Germany, (Leipzig)*.

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Case Studies and how They Helped Develop the Field of Psychology

It is said to be a scientific discipline because it utilizes scientific methods of reasoning and experimentation using empirical research. Therefore, knowledge is obtained through measurable data that is then tested for validity and reliability. The data collected can be both quantitative and qualitative. Quantitative research methodology involves collecting data that can be measured in numerical value, whereas qualitative methodology involves the collection of non-numeric data. This data is collected in order to prove or disprove a hypothesis and form conclusions about a theory. There are multiple methods to do research, both qualitative and quantitative. The most widely used research techniques are Experimental Methods, Case Studies, Correlational studies, Interview methods, Questionnaire methods, and observation methods.

The objective of this paper is to extensively study the case study method. The case study method is an in-depth study of a topic, person, or group. In this method, an individual's history, family relations, and present life are studied extensively to understand causes and patterns of behavior. Case studies can be highly generalized, to fit into a broader population, or highly subjective, to help provide a basis to prove or disprove theory. Case studies are primarily utilized when it is difficult or highly improbable to conduct the experiment using other research methodologies or when the theory being proved/disproved is a novel one and therefore can help form a hypothesis. (Cherry. K, 2024).

There have been several case studies that have been subject to extensive research and have helped further develop the field of psychology. This paper will be discussing some of the most famous case studies that hold notable contributions to the field of psychology.

Anna O.

The case of Anna O proved to be the steppingstone to the concept of psychoanalysis. This case involved a woman by the name of Bertha von Pappenheim, who was diagnosed with an illness called hysteria after her father succumbed to his illness. The symptoms that led to this diagnosis were paralysis, blindness, selective mutism hallucinations, and language difficulties. Anna. O's doctor was Dr. Bruer who tried various techniques to help her. However, one in particular that worked was talking about the difficulties she faced. This method was later established as the "talking cure". It was seen that it helped dissipate the symptoms, the hallucinations in particular. The longer this treatment continued, the more the symptoms of hysteria were reduced, with Anna. O eventually became fully cured after 7 long years. This case has been claimed as the steppingstone towards psychoanalysis, as this is the case that claimed the attention and interest of Sigmund Freud, who later conducted significant research on the unconscious of the mind and gave rise to psychoanalysis. (Cherry. K, 2019)

Kaplan. R, (2004) shed light on the course of Anna. O's treatment throughout the illness and after the "talking cure" was administered and while the "talking cure" employed by Dr. Breuer appeared to be cathartic and curative, according to Ellenberger (1972) cited in Kaplan (2004), the case was "neither cathartic nor a cure." This review was further elaborated on by Elizabeth Thorton who upon further research was able to provide biological explanations for the symptoms displayed by Anna. O. Thornton's research opened up the case to additional review and in turn, additional theorizing by researchers such as Lindsey Hurst, Harold Merskey, Andrea Orr-Andrawes, de Paula Ramos, and several more psychoanalysis to explain her symptoms. However, the most widely accepted view to this date remains to be Freuds and Breuers/Jones.

Case Studies and how They Helped Develop the Field of Psychology

McLeod, S. (2024) focused significantly on how the case of Bertha helped influence and eventually led to the formation of psychoanalysis and multiple techniques in therapy that are still utilized presently. Bertha's treatment was administered in multiple stages which helped originate the treatment methods utilized in modern day psychotherapy and counseling. Freud believed that the symptoms exhibited by Bertha (Anna. O) were indicative of repressed traumas and memories and this ended up being the base of psychoanalysis which theorized upon the psyche of the human mind. The treatments administered helped establish techniques such as free association and transference which further established the sexual component of the human psyche in psychoanalytic theory.

Ramirez, W. (2021) focuses on uncovering the truths and myths surrounding the famous case. Breuer noticed that Bertha's symptoms showed immediate but temporary relief when the patient talked about them. This especially worked under hypnosis, wherein she was able to attribute a cause to her symptoms as well. This method was given several names, but the ones that achieved the greatest popularity were the "talking cure" and the "cathartic method". A myth uncovered here is that Breuer and Freud in their book on the topic of hysteria, claimed that Bertha's symptoms had started to subside to the point of full recovery after this method was devised. However, it was discovered that her symptoms, while offered temporary reprieve, gradually worsened and she eventually was institutionalized. A discrepancy that had been recognized was the attitude adopted by both Freud and Breuer regarding the case. Freud placed his interests and beliefs and falsified the actual events of the case which contrasted with Breuer's attitude regarding the case.

Launer, J. (2005) emphasizes specifically the treatment administered to Bertha (Anna. O) According to all the reports published on the patient, she was seen to be a highly intelligent person, however, the death of her father had such a lasting impact on her that she exhibited extreme symptoms, such as "fatigue, inability to move her head, hallucinations, mood swings, amnesia, tunnel vision, and partial aphasia. During her illness, she suffered the inability to recognize anyone except her physician and she was only able to satisfy herself of his identity by holding his hands." (Launer, J, 2005). The treatment administered to Anna was in three stages; talking and making up stories, hypnosis and finally describing what led to her hysteric symptoms. Breuer's methods resulted in transference, which was ignored by the physician. This, however, was criticized by Freud, as he believed that the feelings must be studied to analyze how they affected her psyche.

There are several other papers that discuss the same idea, each offering its own individual analysis and interpretation of Anna O. Nevertheless, the consensus that nearly all of them have reached is that the case of Anna O. resulted in the formation of a new theory and numerous new therapeutic methods that are still in use today.

Genie O Wiley

The case of Genie Wiley talks about a young girl who was forced into isolation in a dark room, that removed any form of stimulation, from the age of 20 months till the day she was found when she was 13 years old. Genie was forced to remain seated on a toilet, naked, with her hands and feet tied, allowing limited movement of her limbs. She was forbidden from making any noises, and the little communication that she had with her father was through barks and growls. Once rescued, several tests were done on her which concluded that Genie's development was very abnormal and existed at the level of a 1-year-old. This case is specifically important in how it contributed to the development of psychology and language

Case Studies and how They Helped Develop the Field of Psychology

studies and how important developmental milestones are in developing language. (Cherry, 2021)

An article in IvyPanda journal (2023) aims to investigate the contributions of nature and nurture. Further, it focuses on forming a connection between the case of Genie Wiley and Bandura's social learning theory. Due to being kept in isolation from a very young age, it has been difficult to conclude whether difficulties in language development in Genie were solely due to the isolated environment she was kept in. However, the environment did affect her cognitive abilities (Christie and Weston, 2002, 0:25:25- 0:25:50, cited in IvyPanda), including a reduction in the size of her brain, and affected her social abilities. Bandura's social learning theory can be linked to this case because the absence of any type of social stimulation to observe led to the lack of many biological, social and emotional, behavioral patterns. Similarly, a relationship can be established with Genie's case and Urie Bronfenbrenner's model of human development.

The article (IvyPanda, 2023) further mentions the impact of the case on research and how it contributed to understanding the critical period for acquisition of language which states that there is a specific period during lifespan development that allows for peak language acquisition. This theory was disapproved of by Scientists Susan Curtiss and James Kent who noticed that Genie was able to learn and understand multiple words and phrases. However, it was later proved that the theory had some basis in truth to some extent because Genie was unable to make any further advancements in language acquisition after a specific point due to her underlying trauma and because she was no longer in the critical period which resulted in her brain never developing enough capacity to learn a language. (Christie and Weston, 2002, 0:26:02 – 0:26:22).

Vinney. C (2021) aims to talk about how this case became an incredibly vital part of research and the debates on ethics on the research that was conducted on the genie rather than prioritizing her care. The research was funded, and Genie was taught basic social skills and language, however, while her social skills progressed rapidly, her language development halted after a certain time. Thus, eventually the focus of the research shifted to language acquisition. This theory stated by Naom Chomsky and Lenneberg, suggests that humans have an innate ability to learn language, however, this language acquisition can only be done at a particular stage before puberty, after which language would not be acquired. This was proven true in the case of Genie, wherein it was demonstrated that while little language could be developed, grammar and using the language in daily life would always prove to remain a struggle.

Jeremiah B. Dutch (2006) aimed the objective of this paper on the Genie Wiley case and other similar feral child cases and how similar future cases could be handled ethically in terms of the research conclusions. Cook, cited in Johnson and Johnson, (1998) stated that "Each individual case of language deprivation is open to the objection that the treatment given did not reflect adequate teaching of the language".

Genie and Victor (The wild boy of Aveyron, a case very similar to Genie), proved to have been raised in similar situations of social isolation, however different methods of treatments were offered to both due to the difference in the environment of their isolation. In Genie's case, and for cases similar to hers in the future, there were different methods suggested, such as placing her back into isolation, in similar conditions to the one she was found in, removing the negative aspects such as punishments (Shurley). A different technique

Case Studies and how They Helped Develop the Field of Psychology

suggested, for all cases of such feral children, was the use of Electronic Ears, a device used to focus attention on the words specifically by adjusting the frequencies of speech. The purpose of the instrument is to “bring the patient back to a time before there was any trauma” (Jeremiah B. Dutch, 2006).

An article in IvyPanda (2019) exclusively mentions the ethics involved in Genie’s case. Scientists who studied language acquisition and development, however, had no means of proving their theories on completely socially isolated individuals. Genie’s case proved to be a rarity, which scientists honed in on, that could be extensively researched to understand all the language development theories. This, however, led to a debate about ethics where on one hand, scientists prioritized the opportunities that could lead to research, on the other side, the need was seen to prioritize and soothe Genie’s well-being.

The research in this case was particularly unethical because it violated the basic ethical principles which stated that one must respect the subject's personal rights, be given freedom of choice, and avoid harming the object of the study. In Genie's case, Genie was in no capacity to provide any sort of consent or have an understanding of what the research entailed. Furthermore, Despite the already existing neglect and abuse, the research did not benefit Genie at all and rather subjected her to further neglect for the purpose of acquiring scientific results.

Phineas Gage

Phineas Gage is known to be one of the most well-known cases in psychology. It helped set the basis for neuroscience and psychology and the relationship between the two of them. It was the foremost case to suggest the capacity of the brain to influence personality and how, when affected, it can cause shifts in psychological activity. (Teles. R, Filho, 2020) Gage was a worker in construction who was injured when an iron rod penetrated his skull, injuring the frontal lobe of his brain. Gage not only lived through physical trauma but was able to function normally in almost all aspects including memory, speech, and motor movements, however, he exhibited significant changes in personality. (Cherry. K, 2024)

Teles. R, Filho (2020) focuses on the impacts of the injury on Gage and how the knowledge gained from it was subsequently used to develop the fields of neuropsychiatry.

The medical reports of Dr. John Harlow, who assisted in the medical treatment for Gage stated that after gaining consciousness, Gage’s recovery was significant with physical strength and cognitive processes remaining unaltered, however, his personality which was described as “gentle” had deteriorated rapidly, ultimately changing completely. He became an individual with temperament issues, was unable to take any sort of criticism or advice and had rude social interactions with people due to which he was unable to hold a steady job. This radical change in personality lasted for a span of four years. Gages’ case helped the emergence of multiple research studies. Experiments were conducted by scientists such as David Ferrier on monkeys and Dr. Burkhardt who studied the effects of the frontal lobe destroying it. This research and many more helped conclude that the prefrontal cortex directly affected the emotions and behaviors of an individual and helped discover theories about the localization of cognition and its correlated effects on an individual.

Leach. J, O’Driscoll. K (1998) focuses on the observed changes in personality that were noticed in Gage after an accident which resulted in injury to the brain and subsequently the prefrontal cortex. Phineas Gage, a man previously of a very gentle personality was seen to

Case Studies and how They Helped Develop the Field of Psychology

have a very radical personality change where he became impulsive in his desires and irritable when questioned or advised. Furthermore, while his memory and speech remained intact, his intellectual capabilities had been partially impaired. This radical change in personality sparked the scientific research that followed. The most acclaimed one was that Dr. Harlow stated that the frontal lobe of the brain was responsible for personality. This theory faced a significant amount of backlash and disbelief until Ferrier proved it correct by cutting out the frontal lobe of monkeys and observing the changes in their personality. Further, it was seen that the monkeys had also lost their intelligence and ability to pay attention. Since then, numerous experiments have been carried out to explore the outcomes of the prefrontal cortex and the subsequent behavior.

Macmillan. M (2008) aims to investigate the distinct methods that were utilized to determine the path of the iron rod through Gage's skull. Due to the absence of an autopsy, it was very difficult to ascertain the damage done to the brain, and as a result, the skull was used as the guiding reference. Due to the localization of functions of the brain, having only the skull to observe the injuries caused uncertainty in understanding which functions were affected. To understand which areas of the brain were damaged, studies were carried out to determine the path followed by the iron rod through Gage's head. This path helped determine that the left frontal lobe had been impaired, and the partial recovery of abilities was due to the intact right frontal lobe. The other methods included using MRI scans and CT scans (Rick and Ken Tyler) which showed that the right lobe was also damaged but to the extent of the left lobe. A 3D reconstruction of the brain and fitted in a reconstruction of what his skull might have looked like were created by Damasio et al. who then modeled the passage of the iron rod through the reconstructed brain and skull (Damasio et al., 1994). Ratiu and Talos (2004) made a breakthrough when they reconstructed the exact dimensions of Gage's skull and proved that the reason for the radical change in personality was due to the left frontal lobe.

Boss. A (2010) aims to investigate the misinformation that was initially spread and how it contrasted with the actual facts of the case. The initial reports on Gage and the implication of his injuries stated that Gage's intellectual function had zero correlation with the cerebral hemispheres which suggested that the medical practitioner treating him withheld information. The information revealed helped disprove the theory of Phrenology which stated that the personality of an individual was determined by the number of bumps on their skull. A survey done on many published accounts and scientific research helped conclude that the modern representations of Gage's story are usually exaggerated and heavily distorted, going as far as publishing contradictory facts about the case.

Little Albert

Little Albert was the name of a famous psychology experiment that was conducted by John Watson, a behaviorist to understand the process of conditioning. The aim of the experiment was to understand the conditioning processes of emotional reactions in humans. This experiment was done on a 9-month-old boy, who was conditioned to feel fear every time he saw a white rat. This conditioning process was done by associating a very loud noise that scared the child, with the appearance of a white rat, which evoked no fear in the child. The results of the conditioning were that the child now associated the fear of the loud sound with the appearance of the white rat and therefore started crying at merely the sight of the white rat, even with the lack of loud sounds.

An article delves into thorough research on the experiment conducted by Watson. J and Rayner. R (1920). According to the theory, when one is repeatedly exposed to two stimuli,

Case Studies and how They Helped Develop the Field of Psychology

one of which evokes fear, eventually the stimuli that did not evoke fear earlier, will also evoke fear. The experiment based on this theory was performed on a young boy, Albert, who after conditioning, learned to fear white rats. Other aspects of the experiment were noticed, where Albert started generalizing the fear of the white rat to all other furry objects that were white in color. The environment of the experiment was studied to understand if it had any impact on the fear response. It was seen that when the rat was displayed to Albert in a different room, while the response of fear was still present, it was less intense. However, it was noticed that when a significant amount of time had passed without reconditioning, the fear response on seeing the rat diminished and eventually disappeared. Since then, multiple other research has been done on this topic, within the ethical guidelines. The most prominent one is the discovery of phobias and their treatment.

McLeod. S (2023) provided a critical evaluation of the Little Albert experiment. There have been multiple critics who have questioned the validity of the experiment, wondering if “conditioning actually occurred due to methodological flaws” (Powell & Schmaltz, 2022, cited in McLeod. S (2023)). Other criticisms included confounding variables, the presence of a pre-existing phobia, the lack of control variables, and the presence of individual differences which made it difficult to generalize the experiment. Furthermore, a footage study was examined by Powell and Schmaltz (2022) which showed that the fear responses by the child were much milder both before and after conditioning than reported by Watson. In addition, there existed several ethical issues with the experiment; Albert’s parents were deceived about the true nature of the experiment and therefore no informed consent was obtained, additionally, after the experiment was concluded, no steps were taken to desensitize the child to the fear-evoking stimuli and therefore did not remove the psychological trauma undergone by Albert and made no efforts to follow up on the child either.

(Griggs. Richard, 2014) investigates the real identity of Little Albert years after he disappeared. A comparative study has been conducted to determine which among the two probable children could be Little Albert. Multiple reviews have been produced about a boy named Douglas Merritte who has been considered to be Little Albert for a length of time. Douglas Merritte was investigated by Hall Beck. Beck started the investigation by looking into the original reports of the experiment to establish the age of the child. Once established, the search was expanded to Albert’s mother, who was a wet nurse. A woman, Arvilla Merritte, was narrowed down from a list of candidates. Further research into her background and geographical information placed both Arvilla and her infant Douglas at the time and place of Watson’s experiment.

Kitty Genevive

The case of Kitty Genovese was among the most famous murder cases in New York. Catherine “Kitty” Genovese, a 28-year-old woman who worked as a bartender was raped, robbed, and stabbed outside her apartment on March 13th, 1964. The incident sparked widespread outrage when it was revealed in an article that the murder was witnessed by 38 people but none of them attempted to come to her aid. This prompted numerous studies into understanding the psychology behind the lack of aid from the neighbors/ witnesses which resulted in the discovery of the phenomenon “The Bystander Effect”. Further studies have been carried out to comprehend the cause behind the brutal stabbing, where some theorize that it was due to Kitty’s sexuality and her openly acknowledged relationship with her girlfriend at the time. (History.com Editors, 2018)

Case Studies and how They Helped Develop the Field of Psychology

Kassin, S (2017) focuses on some discrepancies found in Kitty Genovese's case and what experiments were conducted in order to study the case further. A major aspect of the case, one that led to widespread outrage in the public, was that the neighbors who witnessed the crime made no efforts to help Kitty by intervening or calling the police. However, it was later found to be untrue as it was because of the intervention of two neighbors that resulted in the arrest of the perpetrator. There have been reports of false confessions during the case, but the discovery of the bystander effect caused it to be overlooked. This phenomenon was termed as "inattention blindness" which was proved by an experiment done by Simons and Chabris (1990). Additionally, Numerous studies were done to study the bystander effect phenomena. Latanè and Darley held an experiment where an individual pretended to have a seizure in the vicinity of several people. Another experiment involved trying to see if the presence of smoke was repeated when the participant was i) alone or ii) with other people. The experiments prompted the experimenters to outline a five-step decision-making process for helping in an emergency situation. These experiments helped provide clarity about the Bystander effect phenomenon which describes that individuals were less likely to offer help in emergency situations if in the presence of others (Kassin, S, 2017).

Manning, R et al (2007) focused on the 38 people that witnessed the murder of Kitty Genovese. The paper begins by pointing out two major discrepancies between the actual facts of the case and the reported version of it. One such incongruence was that there were 38 people who were supposedly eyewitnesses. This, however, was proven to be false when it was discovered that some of the witnesses had only heard a loud sound, making the assumption of it being a domestic brawl or fight. Furthermore, the correct estimate of witnesses is theorized to have been exaggerated and it was later discovered that two of the witnesses had intervened, one yelling at the assailant and scaring him off during the first attack and the other calling the police. The paper further elaborates on the psychology of individuals in groups; The case of Kitty helped prove the deindividuation of people in a group but contradicted the notion that a group is always active. In Kitty's case, a group of people remained passive watchers of a crime while suffering from a diffusion of responsibility and therefore, there existed a hesitancy in coming for Kitty's aid.

Ruhl, C (2023) focuses on the two models that were made in response to the bystander phenomenon. John Darley and Bibb Latane (1968) as cited in Ruhl, C (2023), offered a five-step decision-making process that an individual makes in an emergency situation. A second model was named the cost-benefit analysis where individuals essentially weigh the advantages and disadvantages to make a decision to intervene based on the most favorable outcome for themselves. (Blagg, 2019). Factors affecting the intensity of the bystander effect were studied. An experiment conducted by Latane (1970) and another research where data was collected proved that "the response of bystanders was directly proportional to the health severity of the situation" (Faul et al., 2016). Another factor established was despite the fact that people had a lower likelihood to intervene if the number of bystanders increased, if the individual was part of the group of bystanders, they were more likely to intervene. There exist numerous other factors that affect this phenomenon, however, these are the ones that are very common and extensively studied.

H.M (Henry Molaison)

Henry Molaison, known as H.M., is one of the prominent cases in psychology in regard to memory. H.M. suffered from epileptic seizures and underwent surgery (bilateral temporal lobe resection) to alleviate them. The surgery involved removing parts of the temporal lobe, which inadvertently removed a large section of the hippocampus, which was responsible for

Case Studies and how They Helped Develop the Field of Psychology

auditory and memory processing. (Heaning. E, 2023). While the surgery resulted in fewer seizures, H.M was also discovered to have suffered severe retrograde amnesia and anterograde amnesia, where he could no longer remember anything from the 11-year period prior to his surgery (retrograde) and no longer form new memories after the surgery (anterograde). This case prompted a multitude of research into memory deficits and the areas of the brain involved in memory formation and forgetting because H.M. was the only patient who had amnesia but no other psychotic comorbidities.

Rajesh. S et al (2014) focuses on the critical discoveries made after the case of H.M. was discovered. It was discovered that while the removal of the hippocampus resulted in the loss of forming new declarative memories, H.M. was able to preserve nearly all procedural memories. Furthermore, it was established the hippocampus dealt with long-term memories as it was noticed that H.M. 's short-term memories remained intact, but he faced difficulties in converting them to long-term memories. A series of tests were done to test his memory, the results concluded that; “Henry could easily and accurately perform the task when there was no time gap between stimuli, however, the potential to differentiate between stimuli became harder as the gap between them got longer beyond 30 s” (Rajesh. S et al, 2014) which determined that the duration of short-term memory was 30 seconds.

H.M. was also able to accurately produce conditioned responses which helped recognize that they were not mediated by the temporal lobe. A major discovery reported through the investigation was that the brain occasionally compensated for the loss of the hippocampus and the other areas of the brain took over because of the preservation of brain structures and networks formed before the surgery. Therefore, it can be seen that H.M. 's case had a lasting impact on the study and understanding of memory and the areas of the brain associated with it.

Squire. L (2009) concentrated on the knowledge and research that was gained from H.M.'s case. Originally, the findings from H.M.'s case were not completely accepted because the experiments on the removal of the medial temporal lobe did not show the same results in monkeys. However, after studying anatomical studies on animals and humans helped identify the anatomical components of the medial temporal lobe which allowed the understanding of what parts of the brain affected the memory. After MRI scans, it was made clear that the severe memory loss was caused due to damage to the Para hippocampal gyrus as well. The case of H.M. motivated the development of animal models of memory and helped understand how memory is organized in the brain. It was noticed that information could be retained for longer than 30 seconds if constant rehearsal was carried out. The most unexpected discovery was the presence of multiple types of memories; declarative and non-declarative or procedural memories. It was discovered when researcher Brenda Milner tested his visuomotor skill using the star tracing experiment. Another critical discovery was made when HM could successfully identify familiar objects, even after 6 months of encoding. This indicated that the hippocampus controls only recollection which is why it was impaired. (Benner. T et al, 2014)

Nanda. A et al (2015) focus on other experiments done to experiment with bilateral temporal lobe resection and their subsequent results. Researchers Penfield and Milner executed unilateral temporal lobectomy for more than 80 patients but two patients, PB and FC had bilateral resection which involved resecting the uncus and the hippocampal areas. Out of all the patients, only PB and FC had severe amnesia that was similar to H.M. It was concluded there was a lesion in the right hippocampal region causing memory loss, that was

Case Studies and how They Helped Develop the Field of Psychology

generalized. This conclusion was based on observations made by studying the brain through EEG. Additionally, after the patients' deaths, the brain autopsy showed the remaining hippocampus as a sclerotic tissue with a shrunken tissue area. In another study, Glees and Griffith studied the autopsy findings of an individual with both retrograde and anterograde amnesia and it was seen that areas of the temporal lobe were damaged and some areas of the left hemisphere including the hippocampus were resected. Similar findings were discovered by Zola-Morgan and colleagues and Heinrich Kluver and Paul Bucy, all of which concluded that memory was involved in the temporal lobe and hippocampal region.

Benner. T et al (2014) have done a review on understanding the anatomy of H.M.'s brain using MRI and CT scans. The MRI scans indicated that the length of the resection of the temporal lobe was actually less extensive than originally stated in multiple reports, even the original ones. After the death of H.M., numerous In-situ MRI scans were conducted on his brain and 10 weeks after that, *ex vivo* structural data was obtained. The results concluded that the brain of HM was seen to be more or less intact anatomically, the only damage being present in the resected area of the temporal lobe and atrophy of most of the structures. Furthermore, it was observed that at the end of his life, Hm became demented. This dementia led to the degeneration of structures that were near to the structures that were connected to the hippocampus before the surgery. Additional to this, there was extensive atrophy of the corpus callosum and shrinkage was significant in all lobes of the brain. Further study into the brain scans helps scientists understand what function each structure in the brain plays and how the subsequent damage, resection, or atrophy to it affected HM.

Victor Leborgne ("Tan ")

Victor Leborgne (nickname "Tan ") was an individual who had difficulties communicating. He was subject to epileptic fits in his youth and after crossing the age of 30, he lost the ability to speak. and spent 21 years of his life uttering only one word; "Tan" and on occasion of intense anger, a swear word or short phrase. He was able to express himself and communicate remarkably well through gestures and other non-verbal cues. His intellectual abilities were not affected. A decade after his symptoms appeared, Tan lost mobility on his right side and was bed-bound. He was then transferred and treated under Doctor Paul Broca who termed his condition as "aphemie". An autopsy was carried out on the patient's brain after his death and it was then observed that a lesion present in the frontal lobe of the patient's brain was the cause for his difficulty in speech therefore, the claim that different functions were constrained to distinct parts of the brain. The condition was later given the term Broca's Aphasia. (Nanda. A et al, 2018)

Loi. C et al (2021) studied the theories that formed in response to Broca's claims. Broca collected and studied multiple cases of individuals who had difficulty speaking and identified the same lesion present in all of them in their left frontal lobe, like Tan's. It was then stated that the ability of language was due to the left frontal lobe. This theory was offered originally by Marc Dax in 1836 however it was rejected. Broca's theory led to several advancements in neuroscience and how it affects language. One of the main contributions by Broca was that the left hemisphere of the brain was largely responsible for language. Additionally, Broca also discovered other structures in the brain that generated language. This area was the inferior frontal gyrus which was later termed Broca's area.

Lorch. M (2011) studies the process of arguments and counterarguments made by scientists when two major ideas were pitched; i) Functions in the cortex could be localized, and ii)

Case Studies and how They Helped Develop the Field of Psychology

Impairments in language could exist without any impairments in intellectual abilities. Both these ideas led to the development of research in animals and humans and into aphasiology. The idea that language was controlled by a specific area in the left frontal lobe was met with resistance by several counterarguments made by phrenologists and other researchers. However, this notion was also backed up by multiple other scientists, especially physician Ernest Auburtin, who used his own patients as examples to prove that functions of the brain were localized. Broca additionally stated that the major divisions of the brain divided anatomically had their own independent functions. After additional study, it can be concluded that after multiple months of presentations, the suggestion that language was controlled by the left frontal lobe was a localized function in the brain.

Apart from the case studies referred to above, there several other prominent cases prevail in psychology which are being listed as follows: Chris Sizemore (was a woman who was diagnosed with multiple personality disorder) Kim Peek (a man with exceptional memory that stemmed as a result from a disorder known as Savant Syndrome), Jill Price (A woman who was one of the first few cases of hyperthymesia), John Money (a prominent psychologist who worked in the field of sexuality and gender), and more. These have not been explained further because of the lack of extensive research on the theme.

METHODOLOGY

Secondary data was made use for this paper. For each case study, 10 papers were reviewed; however, only a few were selected due to their strong relevance to the case and because of the presence of additional previously unknown information. Sites such as Google Scholar, Sci-hub, and numerous publishing journals were heavily utilized. Based on the information presented in the papers, a close relevance to each case's impact on psychology, ethical concerns, and any further limitations were identified and discussed in the subsequent sections of the paper.

DISCUSSION

It is evident from the above-given information that the case study method of research has shown multiple different cases that have helped in the development of the domain of Psychology. In the case of Anna. O, the steppingstone for psychoanalysis, studies from Kaplan. R, Mcleod. S, Ramirez. W and Launer. J shed light on the development of psychoanalysis and how Frued furthered it in the upcoming decades. It allowed for the discovery of the unconscious mind and how the mind can influence the body. It also speaks about the different methods of treatment that were given to the patient, which led to the development of modern-day psychotherapy treatments.

In the case of Genie Wiley, the feral child, studies from three articles in IvyPanda journal, Vinney. C and Jeremiah B. Dutch, investigate and bring light to the critical period hypothesis which was proven through the case of Genie Wiley. It was realized that while other skills could be taught, retained, and applied in real-life applications, language could not be learned after a certain threshold. This occurred due to the idea that Genie had crossed the age that was required for the peak development of language. Focus was already brought to the ethical issues that were present during Genie's case and how to avoid them while studying other similar cases.

Additionally, treatment methods for cases similar to Genie were formed and are being researched and utilized in present times.

Case Studies and how They Helped Develop the Field of Psychology

In the case of Phineas Gage, the man who had an iron rod pass through his head and survived but suffered from radical changes in personality, Teles. R, Filho; Leach. J, O'Driscoll. K; Macmillan. M and Boss. A, helped discover that the frontal lobe was responsible for change in personality and for the development and expression of an individuals' personality. This theory was proved in numerous experiments with animals. Other aspects involved recreating the pathway of damage created by the rod through reconstructing the brain and skull, or by simply observing the brain scans of the patient.

In the experimental case of Little Albert, McLeod. S, and an article aimed to investigate the findings from the experimental study of the emotional conditioning of Albert and the numerous other terms associated with the conditioning process (generalization, extinction). The ethical issues involved with the experiments were also discussed and a study was carried out to uncover the true identity of the child.

In the case of Kitty Genovese, a woman brutally murdered outside her apartment, Kassin. S, Manning. R et al and Ruhl. C investigated how the case helped discover an important phenomenon in social psychology called the "by-stander effect". Further the phenomena itself and the factors affecting this phenomenon were studied and established using several experiments. Additionally, multiple inquiries were carried out to look into the discrepancies between the actual facts of the case and the facts that were reported.

In H. M's case, Rajesh. S et al, Squire. L, Nanda. A et al and Benner. T et al were involved in conducting extensive research into the causes of the severe amnesia that H.M suffered through after he underwent surgery for his epilepsy. Several novel discoveries were made with this case in regard to memory and memory systems. The multiple memory system, which not only differentiated between short term memory and long-term memory, but different types of long-term memories were also established. Furthermore, it was discovered that the hippocampal structure in the temporal lobe played the main role in long term memory and the cerebellum was mainly responsible for non-declarative or procedural memories. Multiple tests were conducted to explain other aspects related to memory.

In the case of Tan, Loi. C et al and Lorch. M investigated the role of language production and how it was regulated by the left frontal lobe and a structure called Broca's area (inferior frontal gyrus) which was part of the left frontal lobe. Apart from this discovery, it was also concluded that the structures of the brain were responsible for their own individual, localized functions.

Limitations

For this paper, a very limited number of research papers were reviewed due to the redundancy of the information in each paper. Expanding the research of the case studies to better understand the impacts of the cases on present times can help other researchers, students, teachers, and even the general public emphasize the significance of the aforementioned case studies. Additionally, there exist multiple more famous case studies that helped impact psychology and further develop it, however, due to the absence of relevant information and research on them, they have not been further studied in this paper, rather only been mentioned in this paper.

CONCLUSION

The above information helps one understand the crucial role of case studies in psychology and how they helped further develop the field. Being a field with multiple branches and subdisciplines, these studies not only helped in furthering psychology but also multiple other areas like neurosciences, language development, social psychology and so on. The case studies opened up a broad avenue for extensive research and experiments which has given rise to numerous theories and experiments done to prove and disprove these theories which help satisfy the eternal thirst for knowledge. It also helped disprove some theories and perspectives and provided a clearer view in understanding the human body, mind and behavior and how they interconnect and work in tandem with each other. Therefore, case studies remain an instrumental part of research methodologies in psychology, and they will continue to be so.

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Conflict of Interest

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