

Clinical Psychology

Psychology: Revisiting the Classic Studies

Series Editors:

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Clinical Psychology

Revisiting the Classic Studies

Edited by Graham C.L. Davey



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Cover design: Sheila Tong
Typeset by: C&M Digitals (P) Ltd, Chennai, India
Printed in the UK

Introduction and editorial arrangement © Graham C.L. Davey 2019

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First published 2019

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Library of Congress Control Number: 2018967296

British Library Cataloguing in Publication data

A catalogue record for this book is available from the British Library

ISBN 978-1-5264-2811-0
ISBN 978-1-5264-2812-7 (pbk)

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2

The Experimental Study of Mental Health Problems: Building on Watson and Rayner (1920)

Watson, J.B. & Rayner, R. (1920)
Conditioned emotional reactions,
Journal of Experimental Psychology,
3: 1–14

Dirk Hermans, Yannick Boddez and
Bram Vervliet

BACKGROUND

In 1920, John B. Watson and his collaborator Rosalie Rayner published a study that is best known in reference to the name of its sole participant: Little Albert. Conditioning was induced in the 11-month-old Albert by pairing a stimulus that initially did not evoke fear (i.e., a white rat) with an aversive outcome (i.e., a loud noise). After repeatedly presenting the rat together with the loud noise, Albert started to react fearfully to the rat. In addition, Watson showed that this acquired fear ‘transferred’ to related stimuli, such as a rabbit and a dog. The study can be viewed as the very first laboratory demonstration of conditioned emotional responses in humans.

The ‘Little Albert’ study is a classic in psychology textbooks and is often cited as the foundation on which the domain of the experimental study of psychopathology has been built. The experiment, which was conducted exactly 100 years ago,¹ became part of psychology’s heritage and folklore, but not without being surrounded by ethical and methodological critique, myths, and a quest for the identity of Little Albert.

John Broadus Watson was born in 1878, studied philosophy under John Dewey, and received his PhD in 1903 from the University of Chicago. In 1908 he was offered a position at Johns Hopkins University, where he became chair of the

¹The first part of the study is assumed to have taken place around late November or early December 1919 (Beck et al., 2009).

psychology department. His academic career, which ended around 1920, was amidst exciting times for the newly developing domain of psychology.

First, Wilhelm Wundt had opened the Institute of Experimental Psychology in Leipzig in 1879, which is often regarded as marking the start of psychology as a modern science. Much of this early work was directed at the study of phenomena of consciousness, such as perception, memory and language. As we will discuss later, Watson took issue with the concept of consciousness, which he considered as nothing more than superstition or magic.

Second, Watson's work has to be situated in an era that was characterized by Freudian theorizing, which was penetrating the American culture more and more, in particular after Freud's only visit to the United States in 1909 during which he gave a series of lectures. The work of Freud was not only a basis for therapeutic interventions, which were usually carried out by physicians, but also comprised a 'psychology of everyday life'. Watson was fascinated by psychoanalysis and was particularly interested in Freud's theory on affective processes and on how emotions could be 'transferred' from one person or object to another (see Rilling, 2000, for an extensive discussion on Watson in relation to Freudian theorizing). However, Watson rejected both the focus on the unconscious and Freud's methods to study such emotional transfer.

The above already illustrates that, even though Watson is publicly best known for the Little Albert paper, he is first and foremost the founding father of behaviorism. He believed that psychology could only progress as a science if it would stick to the 'observables': the observable responses of the person ('behavior') and the observable stimuli that drive these responses. This was in strong opposition to the work (inspired) by Wundt, in which mental states (such as attention, perception and memory), which could not be directly observed but only inferred, were the subject of psychological investigation. Needless to say, it also contrasted with Freud's approach. Watson's 1913 article ('Psychology as the behaviorist views it') can be considered his personal 'behaviorist manifesto' and a turning point for the future of psychology. Psychology should not be a science of the 'mind', but of 'behavior'. He further argued that methods like 'introspection', which are inherently subjective and therefore supposedly unreliable, should be abandoned. In search of methods that allowed objective testing, Watson became interested in the work of Pavlov, whose work on classical conditioning involved objective manipulation of stimuli (i.e., the contingent presentation of a sound and food) and the objective recording of the response (i.e., the number of drops of saliva by the dog).

As we will discuss later on, Pavlov's methodology inspired the Little Albert study. However, other than in Pavlov's experiments, the response under investigation was an emotional one: Albert's fear response. Watson believed that the study of human emotions was a crucial terrain for psychological experimentation. In a 1917 paper he wrote: *The psychologist is being constantly asked by his own students as well as by the physicians, educators, and jurists: "Why do you not work upon the emotions? They are of more importance in the guidance and control of the*

human organism than any of your hair-splitting work upon thresholds” (Watson & Morgan, 1917: 164). This critical remark about work on thresholds was a direct criticism of work on perception by Wundt and associates.

The existing approaches to emotion research were unsatisfying to Watson. First, Thorndike (1913) had published on the nature/nurture debate in *The Original Nature of Man* and presented a detailed description of all kinds of situations and responses that are involved in emotions. This resulted in an enumeration that ran into the hundreds. Moreover, Thorndike proposed that these situation–response connections (e.g., a large animal eliciting a fear response) are mostly based on nature, not nurture. Watson argued that environment (nurture) has a bigger role to play and that the descriptive approach, while interesting, provides little insight into the mechanism of emotions. Second, while Thorndike was prodigal in ascribing hundreds of different emotions to human nature, Freudian psychoanalysts were overly parsimonious: they only emphasized the fundamental role of sex/love as the emotion/drive that guides and controls human behavior. The Freudian approach has two downsides, according to Watson: it restricts the realm of emotion research to sex/love, and it makes it hardly possible to study emotions in an experimental way. With respect to the first comment, and based on extensive and detailed observations in infants, Watson proposed three fundamental or unlearned emotions: fear, rage and love. Even though he suggested that the number of inborn emotions is broader than sex/love alone, it remains a far more limited set than that proposed by Thorndike. Hence Watson immediately highlights the following challenge: *‘It may be argued that if these three emotional reactions are the important ones and that if the stimuli which call them out are as simple and crude as we now suppose them to be, then our theory of the emotions is superficial and patently unable to care for the enormous complexity in the shading of emotional reactions in adults’* (Watson & Morgan, 1917: 168). Indeed, adults experience and express a much wider range of emotions than fear, rage and love alone. For Watson, it was up to scientific psychology to unveil the mechanisms by which this complexity arises. In order to do so, one should rely not on introspection (as used by Wundt and Freudians), but on a methodology that would fit a behaviorist approach. In that context Watson writes: *‘We should strive to reach some formulation of the emotional reactive tendencies which will give ample scope for psychological experimentation and which will at the same time do justice to the wealth of material which modern psychiatric methods have yielded’* (Watson & Morgan, 1917: 165). In the meantime, Watson was familiar with the work of Pavlov on the conditioned reflex and believed that this methodology could be expanded to study conditioned *emotional* reactions. The Little Albert paper, published in 1920, carried exactly this title: *‘Conditioned emotional reactions.’*

In conclusion, the Little Albert experiment conducted by Watson and Rayner (1920) was an early investigation into the mechanisms by which unlearned emotions that are elicited by simple stimuli (e.g., a fear response resulting from a

sudden loud noise) can be 'attached' to other stimuli (in this case a rat). According to Watson, this could help explain the complex variety of emotions and emotion-eliciting stimuli in adults. In 1917 he had already hinted at related conditioning research being conducted in his lab: *'The writers have already begun the following experiment: by means of a heliostat to suddenly flash a beam of light upon an infant's face, the infant lying face upward upon a table in a dark room; simultaneously with the flash a sound stimulus resembling thunder is made. Our object is to see whether the flash of light will in time come to produce the cry which the noise calls out'* (Watson & Morgan, 1917: 171). This study remained, unpublished, however. As such, the Little Albert experiment can be seen as another attempt at testing this hypothesis.

WATSON AND RAYNER'S STUDY

THEORY

Even though we can nowadays position the Little Albert study within a rich theoretical framework of human fear learning (see Craske et al., 2006), the original theoretical basis was rather elementary. It is remarkable that the introduction of the Watson and Rayner (1920) paper only contains a very brief rationale for the study. Actually, the article would best be read together with the Watson and Morgan (1917) paper that was published 3 years earlier ('Emotional reactions and psychological experimentation') as this theoretical manuscript does a good job in clarifying the background to the study.

As already indicated, Watson believed that the limited set of fundamental and unlearned emotions (fear, rage, love) could be expanded to the complex repertoire of emotional responses in adults by means of conditioning. For the Little Albert study, four research questions were presented: *'(1) Can we condition fear of an animal, e.g., a white rat, by visually presenting it and simultaneously striking a steel bar? (2) If such a conditioned emotional response can be established, will there be a transfer to other animals or other objects? (3) What is the effect of time upon such conditioned emotional responses? (4) If after a reasonable period such emotional responses have not died out, what laboratory methods can be devised for their removal?'* (Watson & Rayner, 1920: 3). In contrast to what was sometimes inaccurately described in older textbooks (Griggs, 2014; Harris, 2011), Watson and Rayner had not been able to 'decondition' the fear in Little Albert, for the simple reason that the boy and his mother left the hospital setting where they were residing before the fourth research question could be tested. Hence, the study focused on the first three.

METHODOLOGY AND FINDINGS

The participant in the study, referred to as Albert B. in the original paper, was tested for the first time around the age of 9 months. His mother was referred to as

a 'wet nurse' in the Harriet Lane Home for Invalid Children. A wet nurse is a woman who breastfeeds and cares for another's child. This position was held by women, often poor, who had just given birth to their own child and were thus able to lactate for a second child for whom the biological mother was absent. As such, Albert was reared almost from birth in the hospital environment. He was described as a healthy, emotionally stable child who almost never cried. At the age of 9 months he was tested with stimuli such as a white rat, a rabbit, a dog, a monkey, masks with and without hair, and cotton wool. At no time did Albert show fear of these stimuli. However, when the child was exposed to the sound of a hammer striking upon a suspended steel bar, he started to cry. So during this baseline test no fear for the white rat and related stimuli was observed, although he clearly disliked the loud noise.

At the age of 11 months, 8 weeks after baseline testing, Watson and Rayner attempted to condition Albert to fear the white rat (Research Question 1). On the first test day (age 11 months and 3 days), the white rat was taken from the cage. As soon as Albert touched the rat, the metal bar was struck behind his head. A second conditioning trial was conducted in the same session. A week later the rat was presented again. The laboratory notes for this second session, which are presented in the article in much detail, describe how Albert was already hesitant to touch the rat. The first conditioning trials were thus not without effect. Another five conditioning trials followed during that second session: each time the touching of the white rat (conditioned stimulus; CS) was followed by the loud sound (unconditioned stimulus; US). At the end of the session, the rat was presented without US. Watson reports: *'The instant the rat was shown the baby began to cry. Almost instantly he turned sharply to the left, fell over on left side, raised himself on all fours and began to crawl away so rapidly that he was caught with difficulty before reaching the edge of the table.'* Based on these observations the authors concluded that this was a *'case of a completely conditioned fear response as could have been theoretically pictured'* (Watson & Rayner, 1920: 5).

Five days after this session, Watson and Rayner set out to test Research Question 2, which was whether the conditioned emotional response would transfer to other animals or objects. First, the rat was presented alone. It produced a fear response, indicating that the conditioned emotional response was still there after 5 days. Subsequently, the experimenters presented a rabbit, a dog, a seal fur coat, cotton wool, and a Santa Claus mask. All these stimuli, which previously did not elicit any fear, now elicited a fear response. However, no fear was observed for a stimulus that was clearly distinct from the white rat (i.e., playing blocks that were often presented to test Albert's general emotional response). It is of note that these observations provided a simple account for the Freudian transfer (e.g., a person eliciting fear or rage due to experiences with a different but resembling person) which, as mentioned above, was of great interest to Watson. Another 5 days later – Albert was 11 months and 20 days old – and after some additional conditioning trials to the rat (to 'refresh' the conditioned fear response that had

somewhat weakened) as well as to the rabbit and the dog, Albert was now tested in a room that was different from the laboratory room in which he had been tested before. In this new context the rat, the dog, and rabbit elicited fear responses, albeit not always very pronounced. Based on these observations the authors concluded that emotional transfers take place to stimuli that are related to the conditioned stimulus (white rat). In addition, the fear responses also emerged when tested in a new context.

Finally, 1 month after the last session, Albert (now 1 year and 21 days) was tested again to assess the effect of time upon conditioned emotional responses (Research Question 3). The Santa Claus mask, the fur coat, the rat, the rabbit, and the dog were presented again (without the aversive loud noise). Fear responses were recorded for all stimuli. Watson concluded that: *'These experiments would seem to show conclusively that directly conditioned emotional responses as well as those conditioned by transfer persist, although with a certain loss in the intensity of the reaction, for a longer period than one month. Our view is that they persist and modify personality throughout life. It should be recalled again that Albert was of an extremely phlegmatic type. Had he been emotionally unstable probably both the directly conditioned response and those transferred would have persisted throughout the month unchanged in form'* (Watson & Rayner, 1920: 12).

CONCLUSIONS

According to Watson the study provided evidence that fear responses could be conditioned, could be 'transferred' to other stimuli, and persisted over time. As already noted, Watson was not able to further investigate the 'detachment' or removal of the conditioned responses (Research Question 4) due to Albert's departure from the hospital. Nevertheless, the authors suggested a number of possible ways in which such 'treatment' could proceed. Their first suggestion was to repeatedly expose Albert to the fear-provoking stimuli without the US being presented. In conditioning terminology this is the equivalent of 'extinction', a procedure that is known to lead to a reduction of the conditioned response, and which is assumed to be the laboratory analogue for exposure therapy (i.e., the treatment of choice for most anxiety disorders). A second suggestion was to 'recondition' Albert by presenting the feared objects while simultaneously stimulating erogenous zones (e.g., lips, nipples) or while simultaneously feeding him candy or other food. In conditioning terminology this procedure is now referred to as 'counterconditioning', again a central element in many effective treatment protocols for anxiety disorders. Finally, Watson suggested a method that would now be considered as 'modeling'. This would have allowed Albert to acquire new behavior by imitation of people who did not behave fearfully or by direct manipulation of his responses around the object of fear (e.g., directing his hands towards it).

The manuscript closes with some final remarks on the impact of the findings. First, Watson argued that whereas 'Freudians' believe that sex (or for Watson love)

is the only basic unlearned emotion from which all others arise, fear (and probably also 'rage') is as primal and is not derived from sex/love. Second, and somewhat more critical for Freudian theorizing, Watson stated that phobias should thus not be traced back to sex alone, but that emotional disorders should be retraced '*... along at least three collateral lines – to conditioned and transferred responses set up in infancy and early youth in all three of the fundamental human emotions*' (Watson & Rayner, 1920: 14). As Rilling (2000) notes and as mentioned above, Watson was interested in the work of Freud and initially tried to explain psychoanalysis in terms of habits and classical conditioning. However, backed by solid scientific criticism (e.g., on the methods and mental concepts that were used), Watson moved to another position and emerged as an arch anti-Freudian (Rilling, 2000: 302). A hint of this might already be observed in one of the closing sentences of the Watson and Rayner (1920) paper, as he stated in a somewhat imaginary reflection: '*The Freudians twenty years from now, unless their hypotheses change, when they come to analyze Albert's fear of a seal skin coat – assuming that he comes to analysis at that age – will probably tease from him the recital of a dream which upon their analysis will show that Albert at three years of age attempted to play with the pubic hair of the mother and was scolded violently for it. (We are by no means denying that this might in some other case condition it)*' (Watson & Rayner, 1920: 14). Watson indeed would not have needed such speculation, but would have simply explained Albert's fear of the seal skin coat by means of transfer from the conditioning experience with the white rat.

IMPACT

In discussing the impact of the Watson and Rayner study, it first has to be noted that this paper marked the end of Watson's academic career. After his wife Mary Amelia Ickes found out about his ongoing affair with Rosalie Rayner (the co-author on this paper), she sought a divorce. Watson's affair and the divorce proceedings became front-page news across the United States, including excerpts of the love letters to Rosalie Rayner (Benjamin et al., 2007; Chamberlin, 2012). Because of this public indiscretion, Johns Hopkins fired Watson in the fall of 1920. After these incidents Watson married Rosalie Rayner, but did not return to academia. These elements are important, as the abrupt end of his academic career prohibited a further investigation of the conditioned emotional response, and left the field with this single $N=1$ study. As Samelson (1980) argues, the Little Albert study should be viewed as an interesting pilot study, rather than as an example of convincing scientific evidence. As a matter of fact, as Watson (now with his wife Rayner-Watson) wrote in a footnote for a 1921 paper: '*The work at Hopkins was left in such an incomplete state that verified conclusions are not possible; hence this summary, like so many other bits of psychological work, must be looked upon merely as a preliminary exposition of possibilities rather than as a catalogue of concrete usable results*' (Watson & Watson, 1921: 493).

Nevertheless, in spite of the fact that his work was incomplete and has not been without critique (see later), the Little Albert study has changed and shaped the field for many decades to come. The impact on the field of clinical psychology was eloquently expressed by Field and Nightingale (2009), who guide the reader through a thought experiment, taking place in a parallel universe where Little Albert escaped from the hospital before Watson could start experimenting on the boy. Having a premonition of what would happen to him, Albert crawled into a laundry basket and so escaped from the Harriet Lane Home for Invalid Children. Watson started a nationwide search for the boy and eventually lost interest in the topic. In that parallel universe, things would have been very different according to Field and Nightingale. Conditioning theories of fear and conditioning-based treatments for fear would be absent, and *'treatments for anxiety would not be exposure-based and would rely on techniques the efficacies of which were not tested empirically. In which case, this parallel world would lack many of the highly successful, quick and economical interventions that our actual world enjoys'* (Field & Nightingale, 2009: 317).

Indeed, even though Watson himself was unable to test techniques to remove the acquired fear in Albert, his views on conditioned emotional responses and how to 'detach' them were included in the work of Mary Cover Jones, who attended a weekend lecture of Watson's in New York and became fascinated with the Little Albert study. She set out to work on this topic and in 1924 reported a case study in which she treated a 3-year-old boy, named Peter, for his fear of rabbits. Jones wrote that *'This case made it possible for the experiment to continue where Dr. Watson had left off'* (Jones, 1924: 310). Basically, she put into practice the plans that Watson had for his fourth research question. In a first phase of the treatment, Peter was confronted with a rabbit over several sessions. The type of confrontation varied gradually from *'12 feet distance'* to *'let rabbit nibble his fingers'*. In addition, together with Peter, three other children – who were carefully selected for their absence of fear of the rabbit – were brought into the room. Using these methods that are now known as gradual exposure by means of a fear hierarchy and modeling, Peter's fear of the rabbit subsided throughout the sessions. In a second part of the treatment, Jones used another method, in which Peter was allowed to eat his favorite food while the rabbit was brought as close as possible without arousing a response that would interfere with the eating. This is what Watson coined 'reconditioning' and is now known as counterconditioning. The treatment effects were not restricted to the rabbit alone: *'The fear of the cotton, the fur coat, feathers, was entirely absent at our last interview. He looked at them, handled them, and immediately turned to something which interested him more. The reaction to the rats, and the fur rug with the stuffed head was greatly modified and improved. While he did not show the fondness for these that was apparent with the rabbit, he had made a fair adjustment'* (Jones, 1924: 314). The treatment that was conducted by Mary Cover Jones, under the supervision of John Watson, was simply revolutionary, as it was so different from the few existing approaches (e.g., the psychoanalytic methods). There is no doubt that the combination of Watson's

theoretical analysis and Jones's case study that directly evolved from that work should be viewed as pioneering and groundbreaking work. About 30 years later, Joseph Wolpe would perfect these methods for the treatment of anxiety disorders (Wolpe, 1958). But the basis for modern exposure therapies can be traced directly to Watson and Jones. Wolpe even dubbed Mary Cover Jones the 'mother of behaviour therapy'. In the parallel universe where Little Albert escaped, we would be without the most effective treatment for anxiety, namely exposure therapy, for so many years the flagship of cognitive behavior therapy.

John Watson and Mary Cover Jones also present a broader historical model for the philosophy behind cognitive behavior therapy: treatment as applied experimental psychology. Scientific knowledge about the mechanisms that drive psychopathology is used to develop and refine treatment procedures. In that sense one could consider Watson to be the father of a domain now known as 'experimental psychopathology' (Boddez et al., 2017).

Other contributions of the Watson and Rayner (1920) study can be summarized as follows: (1) start of experimental research on human emotions, (2) extension of the study of classical conditioning to the domain of emotions, (3) first demonstration of generalization of conditioned fear (Hermans et al., 2013), and (4) bringing attention to crucial learning experiences in childhood to understand adult anxiety (developmental psychopathology). The fact that the Little Albert study is cited in almost all textbooks on psychology is thus not without reason.

CRITIQUE

The Watson and Rayner (1920) study has not been without critique. The first and probably most obvious one is that, at least according to modern standards, the study is methodologically poor and the conclusions are stretched beyond what the data allow. One element is the lack of control: Valentine (1930) had already commented on that aspect of the study. Modern fear-conditioning studies employ one CS that is followed by the US (CS+) and one that is not (CS-; Boddez et al., 2013). The two stimuli are typically similar in terms of previous experience and it is usually determined by chance (or counterbalancing) which one will serve as CS+. The control stimulus allows us to assess the impact of events other than the CS-US pairing that could have an effect on changes in fear to the CS+ (e.g., just being part of an experiment). Even though Watson mentioned that no fear changes were observed for the toy blocks with which Albert was allowed to play, no proper control stimulus was present. That is, the toy blocks probably differed in important respects from the white rat other than just conditioning history (e.g., Albert probably had had more positive previous experiences with toy blocks than with rats).

With respect to the possible criticism of Albert being the only participant of the study, it should be noted that designs with a single participant ($N=1$) are not uncommon and have actually attracted increased interest over recent years. But $N=1$ designs also require excellent controls and statistical analysis. Even though

Watson himself at one point referred to his work as unfinished and at the level of a pilot study (see above), at other times the conclusions that he drew from the experiment went way beyond the data.

Another element of critique has been that early attempts to replicate the Watson and Rayner study apparently failed (Bregman, 1934; English, 1929; Valentine, 1930; but see also Jones, 1931). What is not always added to the citation of these failures is that these studies also suffered from severe shortcomings. For instance, in a laboratory study by English (1929) a metal bar was struck with a hammer as soon as a 14-months-old child touched a painted wooden toy duck. No conditioned fear was observed. However, it would be incorrect to classify this study as a non-replication, since English himself hastened to add that '*We did not succeed in establishing a conditional fear response to the duck for the simple reason that the noise failed to evoke fear*' (English, 1929: 222). Likewise, the other 'non-replications' were actually informal descriptions, non-informative or methodologically as bad – or even worse – as the Watson and Rayner study (Field & Nightingale, 2009; Todd, 1994). As a matter of fact, the question of 'whether or not' fear can be induced by means of a classical conditioning procedure is no longer at stake: this has been amply demonstrated under excellent laboratory conditions in adults as well as children (e.g., Craske et al., 2006; Field & Storksen-Coulson, 2007). The significance of the Watson and Rayner study lies in the fact that it opened a research perspective on human fears that was absent and non-evident at that time.

Other critiques of the study were actually based on misrepresentations of the work, rather than on the study itself. As a matter of fact, the Little Albert experiment has been inaccurately described in many introductory textbooks – sometimes with minor errors such as the age of the boy or the fact that he was conditioned to a rabbit instead of a rat, while other accounts include more important misrepresentations (e.g., Griggs, 2014; Harris, 1979).

Finally, the ethical aspects of the Little Albert study have been a matter of debate. Digdon and colleagues (2014) describe how in the mid-1970s, triggered by a broader concern about ethical conduct in psychology experiments, the study was now reinterpreted as a violation of Little Albert's rights. This went hand in hand with the question of what had become of Albert, as he had been taken from the hospital before Watson could 'decondition' his fears. What had been the consequences of the experiment? Was there any permanent harm?

An early attempt to learn about Albert's identity failed (Murray, 1973). But in 2009, Beck and colleagues published an investigative study that seemed to resolve the 90-year-old cold case. After extensive historic investigation, they identified three foster mothers living at Johns Hopkins hospital and for which there were indications that they were lactating in the winter of 1919–20. One of those was a black woman who could not possibly have been the mother of Albert. The other two were Caucasian. After no association could be found between Albert and one of the two Caucasian women (Pearl Barger), the attention shifted to Arvilla Merritte. Tracing the family history of Arvilla, the researchers contacted Gary

Irons, Arvilla's grandson and one of the co-authors of the 2009 paper. He confirmed that Arvilla had given birth to a boy called Douglas Merritte while working at Harriet Lane Home. Further investigations, including biometric analyses on available pictures of Douglas and Albert, led the authors to the conclusion that baby Albert was indeed the son of Arvilla Merritte. This conclusion was, however, not without debate (Beck et al., 2010; Powell, 2010; Reese, 2010). This was more than a historical debate, particularly when the stakes were raised by a paper in which Fridlund and colleagues (2012) presented evidence that Douglas Merritte was a neurologically damaged boy at the moment of testing. This would imply that Albert had not been the healthy, well-developed and stable boy that Watson had claimed. Moreover, there were indications that Watson may have been aware of these medical problems, which would impact on both ethical and scientific considerations concerning the study. It was at one point even suggested that Watson picked Albert because he was so passive around frightening stimuli, and would have guaranteed low levels of fear during baseline testing.

However, the saga continued when Digdon et al. (2014) revisited the conclusion that Douglas Merritte was Little Albert. With the help of a professional genealogist they identified another boy, Albert Barger, who was the son of Pearl Barger (the second Caucasian foster mother), as the 'real Albert'. Not only would his name suggest that he was baby Albert B., other indications also made him a more plausible candidate than Douglas Merritte. Reviewing all the available evidence, Griggs (2015) came to that same conclusion.

It is clear that the Watson and Rayner study, 100 years later, still appeals to the imagination, and that the impact of the paper goes further than its content alone. It also raises questions about scientific integrity (as viewed in their historical context) and the incessant quest for correct ethical criteria for research with adults and particularly with young children.

CONCLUSIONS

The Watson and Rayner (1920) study is a psychology textbook classic. Indeed, the case of Albert and the white rat presents – like Pavlov's dog – a nice 'opener' for a psychology lecture. But the story is much broader and richer than that. It is the tale of a man (Watson) who struggled to combine his fascination for parts of Freud's theorizing with his own strong views on behaviorism and the directions academic psychology should move into. It is a tale about the romance with his co-author Rosalie Rayner and the abrupt end of his academic career that resulted from this.

What would a parallel universe look like in which Watson and Rayner never met, and in which Watson would have added another 30 years of academic investigations and writings? How would that have changed the face of psychology? It is very plausible that treatments for anxiety would not be exposure-based today. This treatment indeed can be traced back to empirical work that was conducted

by Mary Cover Jones and inspired by John Watson. This clinical application of conditioning principles was simply revolutionary, as it was very different from the dominant approaches at that time (e.g., the psychoanalytic methods).

The Little Albert study also illustrates how psychology classics are presented and often misrepresented in textbooks. It is a saga full of myths and historical detective work about the identity of a boy who participated in a study exactly 100 years ago. It concerns statistical analysis and reporting of studies, the replicability of scientific work as well as ethical questions, all of which should be considered within their historical context.

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