



PEARL

Debunking the Self: Jastrow, Münsterberg and the Automatograph

Drayson, HE

Published in:

A Treasure Trove. Friend of the Photoplay – Visionary – Spy? New Trans-disciplinary Approaches to Hugo Münsterberg's Life and Oeuvre

Publication date:

2018

Link:

[Link to publication in PEARL](#)

Citation for published version (APA):

Drayson, HE. (2018). Debunking the Self: Jastrow, Münsterberg and the Automatograph. In R. Steinmetz (Ed.), *A Treasure Trove. Friend of the Photoplay – Visionary – Spy? New Trans-disciplinary Approaches to Hugo Münsterberg's Life and Oeuvre* (Vol. 0)

All content in PEARL is protected by copyright law. Author manuscripts are made available in accordance with publisher policies. Wherever possible please cite the published version using the details provided on the item record or document. In the absence of an open licence (e.g. Creative Commons), permissions for further reuse of content should be sought from the publisher or author.

Dr Hannah Drayson
Transtechology Research
Plymouth University
B321 Portland Square
Drake Circus
PL4 8AA
hannah.drayson@plymouth.ac.uk

This is the author's accepted manuscript. The final published version of this work (the version of record) is published in Rüdiger Steinmetz (ed), *A Treasure trove. Friend of the Photoplay – Visionary – Spy?* Leipzig University Press. (2018) (pp.143-162).

https://www.univerlag-leipzig.de/catalog/bookstore/article/1918-A_Treasure_trove_Friend_of_the_Photoplay_Visionary_Spy

This work is made available online in accordance with the publisher's policies. Please refer to any applicable terms of use of the publisher. Please do not cite without author's permission.

Debunking the Self; Jastrow, Münsterberg and the Automatograph

Hannah Drayson (Plymouth, UK)

In the 1890s, while director of the psychology laboratory at the University of Wisconsin, Joseph Jastrow invented a psychological instrument he called the 'automatograph'. It was a simple but highly sensitive mechanical device consisting primarily of two panes of glass lain on top of one another, separated by three brass ball bearings. By means of a scribe attached to the top pane, Jastrow used the automatograph to amplify and record onto a smoked glass plate or revolving drum the involuntary movements of a person's hand and arm.¹ With a subject's hand resting on the top pane of glass, and shielded from view with a curtain, Jastrow found that despite being given an instruction not to, subjects would move their hands in ways which they were unaware and in correspondence with the stimuli they were exposed to. For Jastrow the images obtained by the automatograph were evidence for the existence of involuntary, subconscious movement and the potential legibility of its instrumental records.²

What Jastrow wrote about his experiments is intriguing. In an article in *Popular Science Monthly*, he stated that the device not only recorded "the direction of attention", but because "thought is repressed movement"³ the recordings "illustrate in an imperfect way how abundant and intricate are the expressions of the thoughts that lie within."⁴ That he referred to another form of 'mind-reading' – the popular entertainment of muscle reading – as inspiration for the experiment confirms that Jastrow's description of the machine as a mind-reading device was far from careless, or an overstatement to gain attention.⁵ While noting the difficulty of interpreting the

complex squiggles that were derived from his experiments, his claim for the drawings is that they were inscriptions of thought.⁶

Based on this understanding of the device's output, Jastrow's contemporary Hugo Münsterberg made claims for the potential application of automatography in his book *On the Witness Stand*, "if a witness or a criminal in front of a row of a dozen men claims that he does not know any one of them, he will point on the automatograph, nevertheless, towards the man whom he really knows and whose face brings him thus into emotional excitement."⁷ While in reality Münsterberg had mixed results with his forays into applying psychological techniques to legal cases⁸ what he was pointing out was that the tools of experimental psychology could be used to access the usually inaccessible realm of the soul, more usually the remit of human mediums and divinatory technologies. These connections were not without some powerful implications, this relation of inner thought to physiology influenced Münsterberg's student William Marston, who used blood pressure measurement for lie detection in his experiments.⁹

Jastrow argued that "we are slow to appreciate that the sub-conscious and the involuntary find a common and a natural place amidst the soundly reasoned and aptly directed activities of our own intelligence".¹⁰ In order to see through this tendency to overestimate our own "faith in the testimony of consciousness" he proposed the experiments using the automatograph as a "demonstration of the readiness with which perfectly normal individuals may be induced to yield visible evidence of unconscious and involuntary processes, that possesses a special interest; for when the naturalness of a few definite types of involuntary movements is made clear, the application of the experience to more complex and more indefinite circumstances will easily follow".¹¹

Involuntary movements and their potential relation to unconscious or automatic action have been—and remain—common tokens in debates about the relations and distinctions between self, soul, mind, brain, body and world.¹² As Wilma Koutstaal has pointed out, scientific investigations of automatic writing have reliably prompted reconsideration of the apparent distinctions between the psychical and physical, suggesting the question of whether we are always:

"[...] too inclined to construe it as a purely motor or purely mental phenomenon, avoiding any clear conception of a possible hinterland between the maximally and minimally intelligent. [...] Do we want always to connect symbolic activity to a self, to a coherent individuality, so that any version of a disaggregation of consciousness or thought is aversive?"¹³

In accessing, even amplifying, involuntary movements the automatograph functions as evidence and rhetorical device for different readings of the nature and relations of mind and matter, and self and experience. It offers one of many stories to be told about the adaptation of techno-cultural forms such as spiritualism, mesmerism and magic by experimental psychologists as they sought to establish themselves and their discipline in the United States,¹⁴ about how media technologies emerged from the work of inventors contributing equally to science, technology and popular culture.¹⁵

Drawing on key texts which have explored the cultural trends of experimental psychology, particularly with regards to automaticity and deception, alongside primary sources from the period by Jastrow and his contemporaries, this chapter reflects on the context from which the device emerged. Situated between popular culture and psychology and provoking, or at least reifying, questions of the relationship between experience, will, and the self: a close look at the ideas that allow us to make sense of Jastrow's understanding of the automatograph also reveals a long-lasting legacy in popular discussions of the cohesion of self and the testimony of consciousness.

If we consider the automatograph as a scientific instrument, and therefore as an example of "reified theory"¹⁶, what is the theory that it embodies? According to Lisa Blackmann, automaticity (the experience of the involuntary that the device can be seen to enable) is best referred to as an "epistemic thing"¹⁷ which following Rheinberger "refer[s] to entities that escape fixation, and where there is always more to be said than any experimenter at any given moment is trying to tell."¹⁸ As we will see the variety of arguments that were and remain attached to subconscious phenomena suggest that the device itself offers little constraint on the various interpretations of its meaning. Capable of carving up will, awareness and motor movement, the device helps to produce involuntary movements and offers to train its user in the feeling of involuntariness that are usually associated with dissociative phenomena, such as spirit possession, or multiple personalities. Despite this slipperiness in holding automaticity to one or another interpretation, a willfully simple a reading of the automatograph, as Jastrow used it in his experiments, the device can be seen to offer a demonstration of how our bodies act in ways that we are not aware of, perhaps even against our will.

The question of whether 'we' are, or can be deceived about our own wills also raises the question of where 'we' is best placed. As Karen Barad and Ian Hacking have both argued, scientific experiments have a productive effect,¹⁹ their relationship with the phenomena they describe is generative, within the context of the scientific laboratory, the objects of study are produced in a new way. For Hacking:

"Nowhere outside of the laboratory is there such a pure arrangement. [...] In nature there is just complexity, which we are remarkably able to analyse. We do so by distinguishing, in the mind, numerous different laws. We also do so, by presenting, in the laboratory, pure, isolated, phenomena."²⁰

The protocols and tools of automatic movement whether in the séance or the laboratory offered a way to mediate knowledge of the movements of one's own body, to isolate the phenomena of movement. While they did not create a potential that was

not already there, they frame a potential orientation to, and understanding of self, that may not have been accessible without them.

In 1894 Chicago instrument makers *Garden City Model Works* published a catalogue of Jastrow's designs for psychological apparatus²¹. It advertises two versions of the automatograph. Both designs allowed the hand or arm to rest on a level surface, or scribe, that offered little resistance to movement and so would shift around easily. The more substantial version of the device was made from two glass panes with three machined brass ball-bearings in-between them. Because of the minimal friction— the extremely even surfaces of the glass and regular shape of the ball bearings— even the smallest involuntary movements of the resting hand would cause the top pane to move. These movements were marked by a glass scribe attached to the pane by a metal rod, which at the start of each experiment was dropped down onto a glass plate or revolving drum prepared with lamp-black. These inscriptions, which Jastrow called ‘automatograms’,²² could be fixed with ethanol and shellac to leave records of the hand’s movements that could be studied at leisure.²³

Tests reported by Jastrow involved a range of attention tasks, counting the beats of a metronome, watching a swinging pendulum, reading colours arranged in rows or printed text, or having the lab assistant hide an object somewhere in the lab and having the subject “think intently of the place of concealment.”²⁴ Frictionless, the device freed the hand to shift around— enabling small movements that would otherwise remain unseen. According to Jastrow these movements would show the “direction of attention”²⁵ – in a literal sense – following a subject’s eye movements as they followed the pendulum, or concentrated their attention on a particular place in the room where an object had been concealed.

This experiment of hiding and revealing objects clearly references the “striking”²⁶ exhibitions of muscle-reading that Jastrow notes as cause of dispute regarding whether subtle muscle movements were “sufficiently definite for the purposes of the ‘mind-reader’”. He notes that while “many worthy and learned persons were absolutely certain that they had given no indications whatever [...] the development of experimental research in the domain of psychology has made possible a variety of demonstrations of the truth and adequacy of this explanation.”²⁷ The automatograph investigations acquired “visible records” of the involuntary movements that could explain the impressive demonstrations of the exhibiting mind-reader.²⁸

In his biography of Jastrow, Arthur Blumenthal described the automatograph as a “scientific-instrument version of the Ouija board.”²⁹ It is not a great surprise that Jastrow, a committed and outspoken opponent of spiritualism,³⁰ was engaged with scientific investigations in this area, as were many of his contemporaries, including William James and Hugo Münsterberg.³¹ Heralded as an ‘ingenious method’³² by his student and colleague Clark Hull, Jastrow’s approach to the

investigation clearly drew upon what was, by the 1890s, a long history of vociferous debate in the United Kingdom between physiologists, philosophers, spiritualist mediums, and the spiritualist press.³³ William Benjamin Carpenter was a physiologist who from the 1850s penned articles attacking occult interpretations of the phenomena associated with mediumship, particularly automatic writing, table turning and slate writing.³⁴ Experiments made by Myers and Gurney and reported in the *Journal of the Society for Psychical Research (S.P.R)* in 1888 explored the problem of automatic writing.³⁵ Jastrow appears to be referencing Carpenter when he states that there are good arguments for the physiological explanation of involuntary movements, including what Carpenter called ‘ideo-motor’ movement, “the involuntary response made by the muscles to ideas with which the mind may be possessed when the directing power of the will is in abeyance.”³⁶ It is likely that Jastrow was familiar with the works of the S.P.R (he was an original founder, with William James, of the American Society for Psychical Research – although he had left the society by 1890), as well as Carpenter's, given that he was a fellow critic of the claims of spiritualism.

The similarity that Blumenthal was pointing out, was to the mobile part of the Ouija board known as the ‘planchette’ (from the French ‘little plank’). It was a small wooden board on three wheels or legs on which sitters would place their hands or fingertips during spiritualist séances. Responding to the unconscious hand movements of the sitters, the device would often move around the table, sometimes producing a text with an attached pencil, or pointing to letters marked on a Ouija Board. According to Sargent's 1869 *Planchette; Or the Despair of Science*, the form taken by the planchette was reportedly the product of innovations in the practice of table rapping. This was the tedious protocol of calling out letters until a loud rap was heard. The ‘planchette’ was the center of a considerable fad in households across France and the United States in the late 1860s.³⁷ The interest and technical mindedness of scientific investigators that led to the calling out of letters to be replaced with the table pointing towards a written letter, and then the table itself being made smaller. The addition of wheels completed the planchette.³⁸ The automatograph device that Jastrow produced was another stage in an ongoing collaboration between occultists and experimental science.

In the 1860s *Scientific American* published an article calling for an investigation of those involuntary phenomena that “seem to indicate that the human body may become the medium for the transmission of force to inert and dead matter.”³⁹ The medium's actions might be “in obedience to the will of others, or by the action of the nervous power upon the muscular system”⁴⁰ but key was that “those through whom or from whom it emanates are totally unconscious of any exercise of volition, or of any muscular movement, as acts of their own wills.”⁴¹ Regardless of the source of the force— and the ontological ideas that it evidenced— the same constellations of

unaware subject and apparently exterior or interior ‘other’ wills were to be found in table rapping and Ouija boards (the intervention of spirits), muscle reading (the intervention of subconscious ideas), and mesmerism (the will of the mesmeriser, exerted via animal magnetism or by suggestion). Intriguingly, the ‘transmission of force to dead matter’ suggests the editorial’s author was sensitive to a threshold between the living and base material world at which something new might come into being. What was key to all of these interpretations whatever the cause, is that the medium’s experience, was one of movement from elsewhere, a source unknown, or unverifiable.

Morton Prince's 1910 edited volume *Subconscious Phenomena* offers an overview of how the problem of the involuntary was understood by Jastrow and his contemporaries. In the hope that an “agreement in terminology might be reached”⁴² Prince identified key definitions of ‘subconscious’ from the contributions to the book. The three he takes from Hugo Münsterberg's essay are particularly useful. The first is the popular, or “layman’s” view; this is the idea that all minds are split into “upper and lower” or “waking and submerged selves”.⁴³ In this the subconscious is an entire underlying and separate ‘I’. The second; the “physician's subconscious”,⁴⁴ is pathological in source, it’s signs include dissociative phenomena such as “the lost tactile sensations of anaesthesia” in automatic writing, hysterical catalepsy, and is caused by dissociated or repressed ideas or secondary selves that that may become dominant. His third type (to which he notes he would personally subscribe— at a push), is the “psychologist’s subconscious”, or “physiological subconscious”. This

“can be best explained as pure neural processes unaccompanied by any mentation whatsoever. These phenomena become therefore pure physiological organic processes of the body. The term subconscious thus becomes equivalent to the old theory of Carpenter’s ‘unconscious cerebration.’”⁴⁵

In this examination of Koutstaal’s “hinterland of the maximally and minimally intelligent”⁴⁶, Münsterberg argues that just as any perception is based on a physiological change, so the act of remembering may itself be physiological, a “fresh excitement of the brain.”⁴⁷ When thoughts or new ideas occur to us, he asks, why should we consider them as necessarily requiring an accompanying psychical state? Even if the actions in question are “purposive and selective”⁴⁸ there are many bodily systems that arguably make complex decisions:

“When a body digests a meal, a hundred thousand cells are performing the most complex acts for the purposes of the organism, and they select the right chemical processes more safely than any chemist would be able to do; yet nobody presupposes that there is a mental interplay in the

intestines. [...] have we any reason to expect less from the tissues of the central nervous system?”⁴⁹

While the position he develops is comparable with that of embodied mind theory in contemporary philosophy of mind, Münsterberg flatly denies the existence of a “layman’s subconscious” an alternate mind or awareness: for him “there are no mental facts which go on outside of those which are in consciousness”⁵⁰ because a mental fact is *a priori* a conscious experience. For Münsterberg it is at this point that the discussion moves into what he considers to be philosophical territory. Consciousness cannot be considered a scientific object and the psychical realm should not be confused with that of the objective, material world that concerns scientific psychology.

Rather than consider consciousness as off limits, Morton Prince was eager to indeed “presuppose [...] a mental interplay in the intestines.”⁵¹ In the penultimate chapter of *Subconscious Phenomena*— which gives him what is more or less the last word— he argues for a pan-psychist view: “there is no distinction to be made between conscious processes and brain processes of a certain order, excepting as a point of view. They become identified one with the other. The psychical is the reality of the physical.”⁵² Prince takes a different view on the issue of whether thought and awareness are related. Even if they are not consciously reported, can we be sure that thoughts, or something approaching mentation are not there?⁵³ For him the problems surrounding the question of what automaticity meant to an understanding of the mind was caused by a general failure of “understanding how we can have states of consciousness of which we are unaware”⁵⁴ and stemmed from how awareness and thought were represented.

“Consciousness is represented as a functioning unity, and it is difficult to accept the notion that all states of consciousness are not so synthesized as to form part of that great system which we dub self-consciousness. [...] We find it difficult to conceive of a conscious state that is not part of a self-conscious self [...] a state of consciousness, a sensation, a perception, an idea floating off – so to speak – by its lonesome self and not attached to anything that can be called a self.”⁵⁵

Prince's words draw attention to the importance of how self and will are framed within the discussion of automaticity, with the result that these expectations are disappointed;

“It is difficult to conceive of anything worthy of the being called a sensation or perception, excepting so far as there is a self to experience it; and yet it really is a naïve conception to imagine that we are self-conscious of

each and every conscious state that is aroused in correlation without [sic] nervous system.”⁵⁶

Despite his apparent denial of the psychical, it is worth noting here that Münsterberg’s position in the discussion was equally nuanced in terms of its understanding of consciousness and awareness. He asks his reader to imagine that their mind were

“[...] wandering in a tiresome lecture, where one might become concerned with one’s own inner problems and for a while, the words of the speaker fade to the edge of the conscious field. One might come back to this awareness, still being able to remember having been in the room, and focus back, even remembering what has been said. Or the stimulus of the voice becomes so low in awareness that it slips out, but then it does not become the realm of the subconscious, but that of the merely physiological, the excitement of the neural structures associated with listening no longer excite the sensorium to bring the sound into awareness.”⁵⁷

As Münsterberg indicates, the psychologist’s subconscious or something approaching it, had been in currency for some time. He refers to Benjamin Carpenter’s term “unconscious cerebration”.⁵⁸ Already in 1852, Carpenter had exhaustively detailed involuntary phenomena and argued that they were evidence of non-conscious thought and bodily, reflex action.⁵⁹ However, for Carpenter and many of his contemporaries, the theological implications of this materialist– or at least monist– perspective meant that his arguments could not be entertained, they were in fact implicated in a long history of ideas that had been actively repressed.

According to Reed, from as early as the 1740s the study of reflex actions had raised theological problems about the soul and where it might be found. When Robert Whytt discovered the spinal reflexes, and their regulation of ‘intricate bodily functions’⁶⁰ such as breathing, it suggested that at least some part of the soul must reside in the spinal cord, for how otherwise was the motivation and control of these functions achieved? As Reed explains, viewed within the long history of physiological exploration that that followed these discoveries the

“[...] idea of a soul or mind that is distributed throughout the spine and perhaps even throughout the body (as opposed to being locked inside the skull) forms a kind of counterpoint to mainstream psychological and physiological thought.”⁶¹

A “distributed soul” was, for many “dangerously close to the ‘animal’ aspects of the world, and tended to make the soul indistinguishable from our viscera.”⁶² Hence the context within which the aforementioned discussions were taking place was one in which a monist perspective that collapsed mental and physical was off limits. Instead,

Reed argues, the ‘new psychology’ developed a dualistic view that, “instead of opposing mind and body, separated the ‘conscious mind (the true self) and unconscious mind (affected by forces ‘outside’ the soul, including the body).”⁶³ Along with physiological studies of the reflexes, automatic writing and involuntary movement (as demonstration of unconscious thinking) could all be counted as evidence for the idea that some aspect of psychical life might take place outside of conscious awareness.

Reed argues that many scholars concerned with the history of psychology have expected, and therefore found a materialism that was not there.⁶⁴ As psychology formed its disciplinary boundaries, and the study of the soul became the study of the mind, one might imagine that the motivation was an increasingly secular, and ascendant, materialist worldview. But Reed’s history shows, the scientists involved maintained religious beliefs which required that at least some part of the mind, like the soul, remained an inviolable entity, separate from the matter of the body, or the physiological subconscious. Despite Carpenter’s insistence on a material and physiological understanding of the involuntary, and his opposition to spiritualism, he did not discount the soul at all, but instead worked to separate the automatic mind from the conscious mind and thus maintain a world-view that could incorporate both psychology and his Unitarian Christian beliefs.⁶⁵

Bearing in mind this debate, we might now turn to how the problems of the unitary self had an influence on way in which psychology was popularized. Jastrow (like Münsterberg) had a long and successful career promoting an appreciation of the new science of scientific psychology in the American press. His reports on the automatograph were only a small part of extensive publishing activity, reaching a wide popular audience through publishing, press, radio and public lecture tours. In 1893 Jastrow served as head of the psychological section of the World’s Fair Columbian Exposition in Chicago, curating a display of instruments from across Europe, presenting the ‘new psychology’ for the first time to a large audience and collecting a mass of experimental data from the visiting public.⁶⁶ According to his 1944 obituary in *Science* Jastrow had “an extraordinarily facile pen”⁶⁷; he wrote for *Cosmopolitan*, *Harpers Monthly*, and *Popular Science Monthly*,⁶⁸ had a syndicated newspaper column titled *Keeping Mentally Fit*, and hosted a show in New York on NBC radio from 1935 to 1938.

Jastrow focused much effort on making psychology useful to everyday people, in “a program that aimed to instruct how to wisely navigate the world of appearances [...] the cultivation of a critical attitude to combat habits that directed perception onto the easy path of self-deception.”⁶⁹ His focus therefore involved explaining how psychology could aid in self-monitoring of actions and beliefs; and advising the public on how they might avoid being deluded or manipulated, particularly by the “frauds and fakery of mind reading, telepathy, feats of magic, Spiritism, and religious cults.”⁷⁰

He penned a number of self-help manuals, including *Piloting your Life, the Psychologist as Helmsman*, as well as a list of mildly condescending titles that explored the psychology of deception; *Fact and Fable in Psychology*; *The Psychology of Conviction: A Study of Beliefs and Attitudes*; *Wish and Wisdom, Episodes in the Vagaries of Belief*; *The Betrayal of Intelligence*; *a Preface to Debunking*, and an edited volume titled *Story of Human Error*.⁷¹ He also reviewed books by supporters of spiritualism and his committed opposition was such that in the 1920s he booked and gave lectures following each date on Oliver Lodge's tour of the United States, provide counter arguments to Lodge's claims.⁷²

According to Michael Pettit, many activities and debates in the formation of experimental psychology in the US were influenced by more general public concern with deception. The nineteenth century was a time in which the effects of urbanisation and industrialisation began to divorce people from the usual social structures that maintained trust.⁷³ One of Petit's examples is branding; in an increasingly anonymous market, the branding of food and medical products allowed consumers to identify that products they were buying were from trusted and recognised sources. As competing businesses made use of similarity to evoke similar recognition in customers, the question of how to define and protect one's brand arose. These were issues that psychologists were able to tackle with scientific insights regarding perception, resemblance and belief.⁷⁴

One obvious way the theme of deception made its way into the laboratory was the work psychologists did recreating and perfecting illusionistic and deceptive phenomena in order to make apparent possible failures of the human perceptual and reasoning systems. Jastrow performed creative and intricate experiments with visual illusions, and phenomena such as stereoscopic vision.⁷⁵ Experiments using weights disguised as other materials or that confused the relation of size to weight (to show the influence of expectation on how objects were perceived) were carefully designed to mislead participants. Based on tools from the commercial magic show, they used experiments which "built on the legacy of stage magic"⁷⁶ by reproducing its apparatus, technique and rhetoric.

At the time these influences were far from hidden; Jastrow was an acquaintance of magician Harry Houdini, who made guest appearances at the former's psychology lectures which were otherwise known for being usually "dull" "windbag" affairs⁷⁷; and in 1888 Jastrow invited two well-known sleight-of-hand magicians into his laboratory to experimentally test their powers of perception.⁷⁸ In marked similarity with the approach taken by the psychological community to these matters, Houdini was well known for structuring his performances around the debunking of fraudulent mediums and others who claimed to have occult powers.

Pettit points out the irony of this rupture with the long-standing tradition of the introspecting gentleman scientist as honest witness; psychological subjects were

redefined as misguided and potentially untrustworthy.⁷⁹ Remarking that in an early collaborative experiment between C.S. Pierce and Jastrow exploring subliminal changes in weight perception, he explains that the pair modeled their understanding of their subjects not on the “honest” and “transparent observer” required for experiments that required introspection but on the “unsavory gambler trying to best a game of chance. As in the automatograph experiments, they separated the observer from the experimenter by a screen”.⁸⁰

In this view, the phenomena of involuntary movement was interpreted as evidence of the failure of individual perception and self-control. It offered testimony for the usefulness of experimental psychology by showing that its methods could reveal previously hidden aspects of an individual’s behaviour. Jastrow and Münsterberg also took pains to argue that the phenomena were an entirely normal and everyday part of functioning. As Jastrow argued: “We are slow to appreciate that the sub-conscious and the involuntary find a common and a natural place amidst the soundly reasoned and aptly directed activities of our own intelligence.”⁸¹ The recording of involuntary movements offered “a demonstration of the readiness with which perfectly normal individuals may be induced to yield visible evidence of unconscious and involuntary processes,”⁸² the automatograph showed that anyone, whoever they might be, could be demonstrably unaware of their own motor actions. In a way that was in equal parts compelling and troubling, it appeared to reveal the both conscious and unconscious thoughts within.

As early as 1910 Münsterberg had argued that it was a misplaced expectation of the unity of conscious experience that made apparently subconscious phenomena appear so problematic.⁸³ The expectation of ‘clarity’ and constancy in one’s memory is belied, he argued, by any observation of our own changes in disposition as we move between different social contexts, with our family, at the office, or at a party, in each case we access different groups of “associations, memories, emotions and impulses”⁸⁴. These effortless and unconscious adjustments of expectation and character have marked effects on our responses and understanding of what we encounter in these different contexts. Levels of awareness, attention and memory all are modified, but rather than switching between different separate ‘minds’ the issue is one of memory integration. Münsterberg describes an example scenario: someone sleepwalks at night and writes a letter, but does not remember doing it. There is no reason to suppose that the writer of the letter is not conscious of writing the letter at the time. It is only later, if they do not remember, that the story of personal awareness is broken.⁸⁵

Despite the vintage of the discussion, the problem of misplaced expectations about the unity of self-consciousness and self-control still feature in popular writing in the contemporary cognitive sciences. In *The Illusion of Conscious Will*, Daniel Wegner

uses a range of experimental evidence from the long study of deception and self-deception in psychology to argue that the experience of conscious will is not always causally connected to action.⁸⁶ Wegner includes Jastrow's experiments⁸⁷ alongside many others exploring involuntary phenomena, showing the ease with which experimental subjects can be made to feel that they are doing something when they are not⁸⁸ or influenced by subliminal stimuli.⁸⁹ Based on this evidence, he suggests that action and the *feeling* of action are not in actuality causally related to one another.

One of the most famous (although now somewhat vintage) experiments in this vein was reported by Benjamin Libet in *Behavioural and Brain Sciences* in 1985 and explored the neurophysiological correlates of decision-making. Libet measured the time between a brain signal (a readiness potential), and the moment at which a subject reported being aware that they had decided to act. The results showed that when a subject is asked to push a button at random intervals, their brains showed readiness to act before they were conscious of having decided, a gap of around 550 milliseconds. Libet argued that the experience of consciously willed action was after-the-fact, and consequently the feeling that action was instigated by conscious will an illusion. This raised a considerable debate on the notion and nature of 'free will', given that apparently voluntary actions appeared to be coming from a source designated different from the self, or at least the experience of it, the brain. The tag-line being that experience, feeling or consciousness were not causally implicated in what happened or what people did; they were simply its results.

The moment has now passed for interrogating Libet's claims, but it is worth noting that among the huge volume of commentary on his experiment, even in its original publication.⁹⁰ A particular criticism was the dualistic perspective required to make the claim that an action carried out by a person's own hand was not carried out by them. Like Carpenter and his contemporaries, whether through imperative or habit, the tendency to willfully expect and interpret a unity of self, resulted in a paradoxical appearance of division.

The example provided by Libet's experiment became highly influential in popular psychology, the mystery of consciousness was no longer an issue of 'how' but 'why'? Why are we deluded to think that we are somehow running a show at which we are merely spectators in something that Daniel Dennett called a 'benign user illusion'?⁹¹ Wegner's book poses this question, and he finally, as Libet did, tries to sneak consciousness back into play. In an attempt to account for some kind of function of the experience of will, Libet suggested that conscious awareness was the feeling of the ability to veto 'involuntary' actions that had been begun.⁹² Differently, Wegner suggested that the feeling of will might assist individuals in the tracking and monitoring the effectiveness of their own actions:

“Even though conscious will does not signal the actual occurrence of mental causation, it serves as a hint that such causation is happening. Each surge of will we feel accrues very quickly into our overall experience of effectiveness and achievement. Admittedly, this experience of will can be mistaken.”⁹³

Throughout these discussions therefore runs a track of ambivalence towards the argument that experimental evidence offers a ‘true’ reading of one’s own experience and actions. Perhaps Jastrow and Münsterberg were not making such sensational claims (although, as we have seen, at the time the physician’s subconscious was a more contentious a proposition). However, they were both concerned with establishing how psychology could correct common misconceptions about the reliability of experiences of will, agency and self.

Wegner’s discussion uncomfortably seems perpetually dogged by the Cartesianism of his forbears, for while he notes the importance of the embodied mind, he then continues to try to account for the results of the many experiments that demonstrate that people often confabulate false reasons for acting that were manipulated in laboratory conditions outside of their awareness. The impossibility is not the separateness of conscious will from action, it is that “willed action” itself can be expected, or even possible. If we are worried about the feeling of loss of will, should we not first ask ourselves when and how we do experience consciously willing and acting? Arguably, it may only be when we are asked to reflect, either during, or after making a decision, in which case, the feeling of will is an experimental artifact, not a disorder of awareness.

From this perspective these problems are generated by sleight of hand. The need to keep materialism under wraps, and the mind as an inviolate and bounded ‘self’ seems to have resulted in a way of talking about people that lends itself to this conjuring trick, variations of which are played repeatedly on the borders of psychology and popular culture. The talk of illusions of self may perhaps be more a way to attract an audience to the real question that Wegner’s book raises, of how these variations on experiences of will are produced. He asks about this in relation to Libet’s experiment, which he argues measures the ability to report on one’s own actions, not act.⁹⁴ It is worth noting that the way in which the technical device inserts itself between the testimony of experience, the machine’s inscription and the psychologist—as engaged in producing ‘benevolent’ illusions—places experimental psychology in the position of mediator and corrector of experience.

However, Wegner also suggests another perspective that we might consider, regarding practices in which experience of will are manipulated as culturally intentional; in which, arguably they may make people more ‘free’, despite the fact that they appear to be ‘deluding’ themselves.

“Several anthropologists have suggested that this ‘alibi’ theory might account for the finding that spirit possession occurs most often among people who are oppressed in their culture – usually the women. The belief in spirits is not just the sharing of a fairy story, but instead is a useful fiction.”⁹⁵

In this sense, which Lisa Blackman has also pointed out,⁹⁶ self-understanding can be cybernetic, as ‘useful fictions’ are incorporated into thoughts, action and possibility.

Regarding this, Blackman cites as an example experiments exploring automatic writing (some of which used a form of the automatograph)⁹⁷ made in Münsterberg's Lab by Leon Solomons and Gertrude Stein while they were graduate students.⁹⁸ These experiments, well-known because of Stein's literary fame, explored the abilities of ‘normal’ individuals to shape and direct attention by engaging in various automatic writing tasks. Like their professor, the two argued that the ability to undertake these tasks was part of normal mental functioning.⁹⁹ They set out to confirm that there was only one stream of consciousness involved in the production of writing and that apparently dissociative behaviors were achieved by rapid switching. However, further to this hypothesis confirmation, Stein's involvement with the experiment (with herself as subject) was to explore the cultivation of individual ability in automatic writing and dissociative ability.¹⁰⁰

Tim Armstrong suggests that this orientation towards “intervention” was central to the period; “[...] characterized by the desire to intervene in the body; to render it part of modernity by techniques which may be biological, mechanical, or behavioural.” Of course, he says, “The idea of intervention – implying a causality, a direct relation – is a difficult one.”¹⁰¹ Understanding how debates around involuntary movement could have come to change experience and ability is complex. However while Stein's work can be seen as quite directly proposing a certain idea about operations on the self, both voluntary and involuntary, Armstrong points out that, Münsterberg's various activities, “exposing a medium; administering the first electric lie-detector test; as a pioneering industrial psychologist testing individuals for their suitability for different types of work; as a writer on advertising, and author of the first major psychological study on film” testified to his concern with “the calibration of the human physiological apparatus in relation to the crisis of modernity.”¹⁰²

This ‘calibration of the human physiological apparatus’ could suggest a rather instrumental approach to the psychological subject, but it must be noted that both Münsterberg and Jastrow¹⁰³ were critical of many of the tendencies of the psychology that grew up in their wake. When discussing the interaction between conscious awareness and subconscious actions, Jastrow is clear that he sees conscious awareness as central, as a

“director of conduct [...] activities in which consciousness plays the largest part are those that give distinction to the intellectual life; its reflective, centralizing leadership permeates the vast and complex organization of the psychic functions.”¹⁰⁴

The importance, for Jastrow is in the balance between involuntary and directed, the

“greatest good of the whole requires equally that the control shall not be relaxed and the direction of affairs left to the unvarying routine of undiscerning subordinates, and that the director shall not insist upon a participation in the work which others should be trained to do, or interfere with efficient service by and intimidating or distrustful oversight of the performance of his subordinates. It is not advantageous to be a mere bundle of habits; but it is a real advantage to have them and to use them.”¹⁰⁵

Here the mind is self-aware and also served by many other ‘psychic functions’. A “vocal anti-behaviorist”,¹⁰⁶ Jastrow's belief in psychology was in its ability to grant individual freedom through self-awareness and insight. Pintar and Lynn have suggested that Jastrow's work in the self-help literature is also, paradoxically connected with automaticity through his studies of hypnosis as applied out-side of the laboratory.¹⁰⁷ They point toward a persistent influence on the work of those who followed; for example Milton Erikson, who while a student at Wisconsin was advised by Jastrow while devising his experiments in hypnosis.¹⁰⁸ Erikson later became known for developing a form of indirect hypnotism oriented around what he called “utilization theory”¹⁰⁹ which aimed to make use of patient's own skills, attributes and ideas, rather than impose change upon them.¹¹⁰

In showing people acting when they thought they were not, the autograph experiments supported Jastrow and Münsterberg's idea that normal individuals could benefit from the assistance, and technological mediation, of experimental psychology. This relation has persisted in popular engagement with psychology, which presents the failure to identify mind and mental experience as a unity as a problematic mystery, rather than a well understood fact. The discussions held by Jastrow and others about the ontological implications of involuntary movement clearly suggested that if it was to be considered part of the conversation at all, mind might better be thought of as something embedded or extended throughout the body. However, as Edwin Reed's historical studies show, the long-standing wider cultural resistances to the notion of soul within the material plane carried a persistent dualism. The resulting effect being the requirement that discourses in the sciences devised bounded realms of conscious and subconscious. The result seems to have been that experiments involving involuntary movements retained their power as problems for understanding science and the self. As a side effect of this the importance of the young discipline

of psychology was maintained, offering authority at a moment in time where religious belief was losing ground and offering it the paradoxical role of mediator between people and themselves.

By simply shielding the hand and giving it a vehicle on which to ride the automatograph could be used to carve up will, awareness, and bodily movement. In many arenas these separations, and the stories told about them offer an experience of the uncanny. In any conjuring trick the audience is led to form an expectation about the state of the world: there is nothing up the sleeve, no rabbits inside the hat. We are told we should experience a unity of self, and agency that is incompatible with what the machine seems to show, and then asked, to actively engage in trying to voluntarily account for an experience of our actions. Engaging with this useful fiction involved Jastrow, Münsterberg and their contemporaries involved in a complex dance between the new science of psychology and its manifestations in popular culture. While their investigations excited and explored apparently mysterious phenomena, these scientists could not really be said to have perpetuated the idea of a ‘ghost in the machine’ but all-the-same they benefitted from the compelling nature of this somewhat magical phenomena.

Works cited

- Alder, Ken. *The Lie Detectors; the History of an American Obsession*. Nebraska: University of Nebraska Press, 2009. Print.
- Anonymous. List of Apparatus for the Psychological Laboratory, Designed by Joseph Jastrow, Ph.D., Professor of Experimental and Comparative Psychology in the University of Wisconsin, Made by the Garden City Model Works, 124 Clark Street, Chicago. Ill. Chicago (Collection Rand B. Evans) 1894. Max-Planck-Institute for the History of Science, Berlin. Web.
- Bachelard, Gaston. *The New Scientific Spirit*. Beacon Press, 1984. Print.
- Barad, Karen. “Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter.” *Signs* 28.3 (2003): 801–831. Print.
- Blackman, Lisa. “Affect and Automaticity; Towards an Analytics of Experimentation.” *Subjectivity* 7.4 (2014): 362–384. Print.
- Blum, Deborah. “Mind Tricks for the Masses.” *University of Wisconsin Magazine*. N.p., 2010. Web. Sept. 2013.
- Blumenthal, Arthur. “Blumenthal (1991) the Intrepid Joseph Jastrow.” *Portraits of Pioneers in Psychology*. Ed. Gregory A Kimble, Michael Wertheimer, and Charlotte L White. New York: Taylor and Francis, 1991. 74–87. Print.
- Carpenter, William Benjamin. “On the Influence of Suggestion in Modifying and Directing Muscular Movement, Independently of Volition.” In: Royal Institution of Great Britain, Weekly Evening Meeting, Minutes of the Meeting. (1852). 147–153. Print.

- Carpenter, William B. *Mesmerism, Spiritualism, &C.*, New York: D. Appleton and Company, 1877.
- Dennett, Daniel. *Freedom Evolves*. London: Viking, 2003. Print.
- Drayson, Hannah. “‘Imagine Being Slapped’ Physiological Instrumentation, Ontology and the Placebo Effect.” *Transtechology Research Reader 2011* (2011): 1–24. Print.
- Earle, Edward W. “Professor Jastrow's Three Dimensional Illusions.” *California Museum of Photography Bulletin* 4.2 (1985): 1–10. Print.
- Erikson, Milton. *Advanced Techniques of Hypnosis and Therapy; Selected Papers of Milton H. Erikson, M.D.* Ed. Jay Haley. New York: Grune and Stratton, 1967. Print.
- Hacking, Ian. *Representing and Intervening; Introductory Topics in the Philosophy of Natural Science*. Cambridge: Cambridge University Press, 1983. Print.
- Heinze, Andrew R. *Jews and the American Soul: Human Nature in the Twentieth Century*. Princeton: Princeton University Press, 2004. Print.
- Henmon, V A C. “Obituary, Joseph Jastrow, 1863-1944.” *Science* 99.2567 (1944): 193–193. Print.
- Hull, Clark. “Joseph Jastrow: 1863-1944.” *The American Journal of Psychology* 57.4 (1944): 581–585. Print.
- Jastrow, Joseph. *Fact and Fable in Psychology*. Boston: Houghton and Mifflin, 1900. Print.
- Jastrow, Joseph. “Further Study of Involuntary Movements.” *Popular Science Monthly* 41 (1892): 637–643. Print.
- Jastrow, Joseph. “Psychological Notes Upon Sleight-of-Hand Experts.” *Science* (1896): 685–689. Print.
- Jastrow, Joseph. “The Mind's Eye.” *The Popular Science Monthly* 54 (1898): 1–38. Print.
- Jastrow, Joseph. *The Psychology of Conviction; a Study of Beliefs and Attitudes*. Boston and New York: Houghton and Mifflin, 2006. Print.
- Jastrow, Joseph. “The Section of Psychology.” 1893. 50–60. Print.
- Jastrow, Joseph. *The Subconscious*. Houghton, Mifflin, 1922. Print.
- Kimble, Gregory A, and Michael Wertheimer. *Portraits of Pioneers in Psychology*. Psychology Press, 2014. Print.
- Koutstaal, Wilma. “Skirting the Abyss, a History of Experimental Explorations of Automatic Writing in Psychology.” *Journal of the History of the Behavioural Sciences* 28 (1992): 1–24. Print.
- Latour, Bruno and Woolgar, Steve. *Laboratory Life; The Construction of Scientific Facts*. Princeton: Princeton University Press, 1986. Print.
- Libet, Benjamin. “Unconscious Cerebral Initiative and the Role of Conscious Will in Voluntary Action.” *Behavioural and Brain Sciences* 8 (1985): 529–566. Print.
- Münsterberg, Hugo. *On the Witness Stand; Essays on Psychology and Crime*. New York: The McClure Company, 1908. Print.
- Münsterberg, Hugo. *Psychotherapy*. New York: Moffat, Yard and Company, 1909. Print.
- Münsterberg, Hugo et al. *Subconscious Phenomena*. The Gorham Press, 1910. Print.
- Natale, Simone. “The Cinema of Exposure: Spiritualist Exposés, Technology, and

- the Dispositif of Early Cinema.” *Semiotic Enquiry* 31 (2011): 113–129. Print.
- Oppenheim, Janet. *The Other World: Spiritualism and Psychological Research in England, 1850-1914*. Cambridge: Cambridge University Press, 1997. Print.
- Pepperell, Robert. *Screen Consciousness; Cinema Mind and World*. Ed. Robert Pepperell and Michael Punt. Amsterdam: Rodopi, 2006. Print.
- Pettit, Michael. *The Science of Deception: Psychology and Commerce in America*. Chicago: University of Chicago Press, 2013. Print.
- Pintar, Judith, and Steven Jay Lynn. *Hypnosis; a Brief History*. Wiley-Blackwell, 2009. Print.
- Punt, Michael, “Shaping Consciousness: New Media, Spirituality, and Identity”. In: Pepperell, Robert and Punt, Michael (eds). *Screen Consciousness; Cinema Mind and World*. Amsterdam: Rodopi, 2006. Print.
- Reed, Edward S. *From Soul to Mind the Emergence of Scientific Psychology*. Yale University Press 1997. Print.
- Sargent, E. *Planchette, or the Despair of Modern Science*. Boston: Roberts Brothers, 1869. Print.
- Skinner, B. F. “Has Gertrude Stein a Secret?” *The Atlantic Monthly* (1961): 50–57. Print.
- Sommer, Andreas. “Psychical Research and the Origins of American Psychology: Hugo Münsterberg, William James and Eusapia Palladino.” *History of the Human Sciences* 25.2 (2012): 23–44. Web.
- Spitz, Herman H. “Involuntary Muscle Movements.” *Nonconscious Movements*. 2014. 1–24. Print.
- Spitz, Herman H. *Nonconscious Movements, From Mystical Messages to Facilitated Communication*. Mahwah, New Jersey: Lawrence Erlbaum, 1997. Print.
- Stein, Gertrude. “Cultivated Motor Automatism; a Study of Character in Its Relation to Attention.” (2004): 1–12. Print.
- Stein, Gertrude, and Leon Solomons. “Normal Motor Automatism.” (1896): 1–21. Print.
- Wegner, Daniel M. *The Illusion of Conscious Will*. Cambridge, Massachusetts: The MIT Press, 2002. Print.

References

- ¹ Anonymous. *List of Apparatus for the Psychological Laboratory, Designed by Joseph Jastrow, Ph.D., Professor of Experimental and Comparative Psychology in the University of Wisconsin, Made by the Garden City Model Works, 124 Clark Street, Chicago, Ill. Chicago (Collection Rand B. Evans) 1894.* (p. 5)
- ² Jastrow, Joseph. “Further Study of Involuntary Movements.” In: *Popular Science Monthly* 41 (1892), p. 637–643.
- ³ Jastrow (1892), p. 398.
- ⁴ *Ibid.*, p. 643.
- ⁵ Jastrow, (1900), p. 308.
- ⁶ *Ibid.*, p. 308f.
- ⁷ Münsterberg, Hugo. *On the Witness Stand; Essays on Psychology and Crime*. (New York: The McClure Company, 1908), p. 125.

- ⁸ Cf. Pettit, Michael. *The Science of Deception: Psychology and Commerce in America*. (Chicago: University of Chicago Press, 2013), p. 160-162.
- ⁹ Cf. Alder, Ken. *The Lie Detectors; the History of an American Obsession*. (Nebraska: University of Nebraska Press, 2009), p. 40.
- ¹⁰ Jastrow, Joseph. *Fact and Fable in Psychology*. (Boston: Houghton and Mifflin, 1900), p. 308.
- ¹¹ Ibid., p.307-8.
- ¹² Cf. Koutstaal, Wilma. "Skirting the Abyss, a History of Experimental Explorations of Automatic Writing in Psychology." In: *Journal of the History of the Behavioural Sciences*. 28 (1992), p. 5-27.
- ¹³ Ibid., p. 5.
- ¹⁴ Pettit, Michael. *The Science of Deception: Psychology and Commerce in America*. Chicago: University of Chicago Press, (2013), pp. 228-230.
- ¹⁵ Cf. Punt, Michael, *Shaping Consciousness: New Media, Spirituality, and Identity*. In: Pepperell, Robert and Punt, Michael (eds). *Screen Consciousness; Cinema Mind and World*. Amsterdam: Rodopi, 2006, p. 89.
- ¹⁶ Latour, Bruno and Woolgar, Steve. *Laboratory Life; The Construction of Scientific Facts*. Princeton: Princeton University Press (1986), p.66.
- ¹⁷ Blackman, Lisa. "Affect and Automaticity; Towards an Analytics of Experimentation." In: *Subjectivity* 7.4 (2014) p. 379.
- ¹⁸ Ibid.
- ¹⁹ Cf. Barad, Karen. "Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter." In: *Signs* 28.3 (2003), p. 815-816.
- ²⁰ Hacking, Ian. *Representing and Intervening; Introductory Topics in the Philosophy of Natural Science*. (Cambridge: Cambridge University Press, 1983), p. 226.
- ²¹ Cf. Anonymous. *List of Apparatus. (1894)*.
- ²² Jastrow (1900), p. 316.
- ²³ Cf. *ibid.*, p. 312.
- ²⁴ *Ibid.*, p. 317.
- ²⁵ *Ibid.*, p. 309.
- ²⁶ *Ibid.*, p. 308.
- ²⁷ *Ibid.*
- ²⁸ *Ibid.*, p. 307-336.
- ²⁹ Blumenthal, Arthur. "Blumenthal (1991) the Intrepid Joseph Jastrow." In: *Portraits of Pioneers in Psychology*. (eds.) Gregory A. Kimble, Michael Wertheimer, and Charlotte L White, (New York: Taylor and Francis, 1991), p. 74-87.
- ³⁰ Cf. Blum, Deborah. "Mind Tricks for the Masses." In: *University of Wisconsin Magazine*. N.p., 2010. Web. Sept. 2013. Cf. Blumenthal (1991), p. 80. Cf. Henmon, V A C. "Obituary, Joseph Jastrow, 1863-1944." In: *Science* 99.2567 (1944), p. 193.
- ³¹ Cf. Oppenheim, Janet. *The Other World: Spiritualism and Psychical Research in England, 1850-1914*. (Cambridge: Cambridge University Press 1985), p. 245. Cf. Sommer, Andreas. "Psychical Research and the Origins of American Psychology: Hugo Münsterberg, William James and Eusapia Palladino." In: *History of the Human Sciences* 25.2 (2012), p. 23-44. Web.
- ³² Hull, Clark. "Joseph Jastrow: 1863-1944." In: *The American Journal of Psychology* 57.4 (1944), p. 583.
- ³³ Cf. Oppenheim (1985), p. 244; 352.
- ³⁴ Cf. Carpenter, William Benjamin. "On the Influence of Suggestion in Modifying and Directing Muscular Movement, Independently of Volition." In: Royal Institution of Great Britain, Weekly Evening Meeting, Minutes of the Meeting. (1852). Pp. 147-153.
- Carpenter, William B. *Mesmerism, Spiritualism, &C.*, New York: D. Appleton and Company, 1877. (p. 242).
- ³⁵ Cf. Koutstaal (1992), p. 6-8.
- ³⁶ Cf. Carpenter *Mesmerism*, (1877) p. 242.
- ³⁷ Sargent, E. *Planchette, or the Despair of Modern Science*. (Boston: Roberts Brothers, 1869), p. 1.
- ³⁸ Cf. Sargent (1869), p. 2-3.
- ³⁹ *Ibid.*, p. 7
- ⁴⁰ *Ibid.*
- ⁴¹ *Ibid.*
- ⁴² Münsterberg, Hugo et al. *Subconscious Phenomena*. (Ort: The Gorham Press, 1910), p. 9.

- ⁴³ Ibid., p. 12.
- ⁴⁴ Ibid., p. 10-11.
- ⁴⁵ Ibid., p. 15-16.
- ⁴⁶ Cf. Koutstaal (1992), p. 6-8.
- ⁴⁷ Ibid., p. 24.
- ⁴⁸ Ibid., p. 25.
- ⁴⁹ Ibid., p. 26.
- ⁵⁰ Münsterberg, Hugo. *Psychotherapy*. (New York: Moffat, Yard and Company, 1909), p. 160.
- ⁵¹ Jastrow, Joseph. *The Subconscious*. (Houghton: Mifflin, 1922), p. 98.
- ⁵² Ibid.
- ⁵³ Cf. *ibid.*, p. 73-76.
- ⁵⁴ Ibid., p. 92.
- ⁵⁵ Ibid., p. 92-93.
- ⁵⁶ Ibid. 93.
- ⁵⁷ Ibid., 152-153.
- ⁵⁸ Münsterberg (1910), p. 16.
- ⁵⁹ Cf. Reed, Edward S. *From Soul to Mind the Emergence of Scientific Psychology*. (New Haven: Yale University Press, 1997). p. 77.
- ⁶⁰ Ibid., p. 5.
- ⁶¹ Ibid., p. 6.
- ⁶² Ibid.
- ⁶³ Ibid., p. 7.
- ⁶⁴ Cf. *ibid.*, p. 4.
- ⁶⁵ Ibid., p. 77-78.
- ⁶⁶ Cf. Blumenthal (1991), p. 82.
- ⁶⁷ Henmon (1944), p. 193.
- ⁶⁸ Cf. Earle, Edward W. "Professor Jastrow's Three Dimensional Illusions." In: *California Museum of Photography Bulletin* 4.2 (1985), p. 1-10.
- ⁶⁹ Pettit (2013), p. 63.
- ⁷⁰ Ibid., p. 80.
- ⁷¹ Cf. Henmon (1944).
- ⁷² Cf. Behrens, Peter. J., War, Sanity and the Nazi Mind. *History of Psychology*. Vol 12 : 4, 266-284. p.269.
- ⁷³ Cf. Pettit (2013), p. 4-6.
- ⁷⁴ Cf. *ibid.*, p. 126.
- ⁷⁵ Cf. Earle (1985), p. 2-16.
- ⁷⁶ Cf. Pettit (2013), p. 71.
- ⁷⁷ Cf. Blumenthal (1991), p. 84
- ⁷⁸ Cf. Jastrow, Joseph. "Psychological Notes Upon Sleight-of-Hand Experts." *Science* (1896), p. 685-689. Pettit (2013), p. 63-71. Blum (2013)
- ⁷⁹ Cf. Pettit (2013), p. 56.
- ⁸⁰ Ibid.
- ⁸¹ Cf. Jastrow (1900), p. 307.
- ⁸² Ibid., p. 308.
- ⁸³ Münsterberg (1909), p. 154-155.
- ⁸⁴ Ibid, p. 154-155.
- ⁸⁵ Ibid, p. 153-154.
- ⁸⁶ Cf. Wegner, Daniel M. *The Illusion of Conscious Will*. (Cambridge, Massachusetts: The MIT Press, 2002), p. 14-15.
- ⁸⁷ Cf. *Ibid.*, p. 122.
- ⁸⁸ Cf. *ibid.*, p. 74.
- ⁸⁹ Cf. *ibid.*, p. 81.
- ⁹⁰ Cf. *ibid.*, p. 539.
- ⁹¹ Cf. Dennett, Daniel. *Freedom Evolves*. (London: Viking, 2003), p. 236-237.

- ⁹² Cf. Libet, Benjamin. "Unconscious Cerebral Initiative and the Role of Conscious Will in Voluntary Action." In: *Behavioural and Brain Sciences* 8 (1985), p. 536.
- ⁹³ Wegner (2002), p. 334.
- ⁹⁴ Cf. *ibid.*, p. 65.
- ⁹⁵ Wegner (2002), p. 246.
- ⁹⁶ Cf. Blackman (2014), p. 374.
- ⁹⁷ Cf. Stein, Gertrude, and Leon Solomons. "Normal Motor Automatism." *Psychological Review*, Harvard Psychological Laboratory (1896), p. 295.
- ⁹⁸ Cf. *ibid.*
- ⁹⁹ Cf. *ibid.*, p. 292-293.
- ¹⁰⁰ Cf. Blackman (2014), p. 371-372.
- ¹⁰¹ Armstrong, Tim. *Modernism, Technology, and the Body*. (Cambridge: University Press, 1998), p. 5.
- ¹⁰² *Ibid.*
- ¹⁰³ Cf. Pintar, Judith, and Steven Jay Lynn. *Hypnosis; a Brief History*. (Chichester: Wiley-Blackwell, 2008), p. 99.
- ¹⁰⁴ Jastrow, Joseph. *The Subconscious*. Boston and New York: Houghton, Mifflin, and Company. 1922. Print. p. 33.
- ¹⁰⁵ Cf. *Ibid.*
- ¹⁰⁶ Cf. Pintar and Lynn, (1998).
- ¹⁰⁷ Cf. *ibid.*, p. 113-114.
- ¹⁰⁸ Cf. Erikson, Milton. *Advanced Techniques of Hypnosis and Therapy; Selected Papers of Milton H. Erikson, M.D.* (ed.) Jay Haley. (New York: Grune and Stratton, 1967), p. 119.
- ¹⁰⁹ Cf. *ibid.*, p. 111.