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How to turn interior monologues inside out: epistemologies, methods, and research tools in the long twentieth century

Viktoria Tkaczyk^{a,b}

^aDepartment of Music Studies and Media Studies, Humboldt-Universität zu Berlin, Berlin, Germany; ^bMax Planck Institute for the History of Science, Berlin, Germany

ABSTRACT

This paper addresses the interior monologue as a “sonic thing” whose elusive nature prompted a wide range of research initiatives in the long twentieth century. Neurophysiologists, developmental psychologists, psychoanalysts, and linguists shared an increasing interest in what humans hear when talking and listening to themselves. From diverse disciplinary perspectives, they agreed that “interior monologues” or related phenomena such as “inner speech” are crucial to human cognition, the psyche, and the faculty of speech. And all of them saw these phenomena as constituting important theorems in their own disciplines. In order to investigate interior monologues, the scholars and scientists presented here attempted to turn them inside out, making creative use of a great variety of research tools. A pivotal figure in this respect was the Stanford-based linguist Ruth Hirsch Weir, who, in 1962, produced magnetic tape recordings of her son’s “crib talk”. Interpreting the infant monologue as a precursor of the interior monologues of adults, Hirsch Weir brought together seemingly irreconcilable work on “inner language” by Lev Vygotsky, Sigmund Freud, and Roman Jakobson. In turn, her study inspired a series of further research initiatives – among them Jacques Lacan’s work on the “autonomous play of speech” in children and adults.

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In 1962, Ruth Hirsch Weir, a linguist working at Stanford University, published her first monograph, *Language in the Crib*. For her study, Hirsch Weir had recorded the “pre-sleep monologues” of her son Anthony at the age of twenty-eight to thirty months, “alone in his crib, talking to himself” (1962, 7). She analysed the magnetic tape recordings during a summer 1961 research visit with the linguist Roman Jakobson at the Massachusetts Institute of Technology. Unfortunately, the relevant MIT archives no longer hold the tape recordings, though they do contain correspondence between Hirsch Weir and Jakobson stretching over several years.¹ Hirsch Weir’s son, now aged fifty-nine and living in California, is also unaware of the tapes’ whereabouts.² In answer to my request, Anthony Weir told me he had asked family members but no one knew where the tapes might be; his parents had moved house many times. He would dig about in old boxes and let me know if he discovered anything.

That would be a momentous find, given that the recordings mark the intersection of important work in the 1960s: regarding Anthony's pre-sleep monologues as precursors of the interior monologues of adults, Hirsch Weir brought together the various and seemingly irreconcilable work on "inner language" of Lev Vygotsky, Sigmund Freud, and Roman Jakobson. And in the wake of Hirsch Weir's studies, Jacques Lacan and an array of renowned authors in linguistics, psychoanalysis, and philosophy became interested in the role of infant monologues in the formation of language, thought, and the psyche.

In what follows, I use Hirsch Weir's remarkable work as an opportunity to look at a century of research on interior monologues and related phenomena such as "inner language" and "inner speech". By addressing such a long period of time, this paper is necessarily explorative and selective, carving out strands of research that lead to Hirsch Weir's work or start from there.³ Apart from lines of epistemological reception, my narrative is guided by the diverse methods that scholars selected to study interior monologues and thereby turn them inside out. Methodologically, I distinguish between documentary observation, experimental or induced observation, and associative observation as the products of particular theories and types of research. Retracing the broader context of Hirsch Weir's contribution, I first examine related work by linguists, developmental psychologists, and psychotherapists in the 1960s, then turn to their predecessors since around 1880: French neurophysiologists who experimented with provoking "inner speech" through media such as flashing lights, diaries, and notebooks and re-evaluated the long-standing topos of "inner speech" in debates about the origins of human language. From there, I trace how these methods of examining inner speech were taken up and developed in early twentieth-century linguistics and psychoanalysis. I then return to the 1960s and up to the 1980s, to offer a new reading of the uses of audiotape and computer programs in research on internal monologues.

The internal monologue is an elusive research object, and more specifically a "sonic thing" that owes its audibility to creative observation and experimentation, much as "epistemic things" in the life sciences emerge in the process of experimental investigation.⁴ The various different approaches I discuss may thus be regarded as "techno-epistemic processes that bring conceptual-phenomenal entities – epistemic things – into being" (Rheinberger 2010, 244). Focusing on the media and research tools chosen by scholars to capture this thing, I consider their engagement with the technological devices and the ways in which their creative use of those devices shaped the sonic thing under investigation.

It is no longer necessary to hammer home the message that the choice of research tools impacts upon research findings, and I am aware that by emphasising cases of technological use, I am to a certain extent repeating what has long since become a truism in media studies and Science and Technology Studies (STS): every technological medium and research tool, when examined in detail, reveals a myriad of possible uses, so that technologies must be regarded as both open and constantly emergent (see Vogl 2007). In place of a primacy of design, operational logics, or technological autonomy comes attention to the "co-construction of users and technology" (Oudshoorn and Pinch 2003, 1) or, in the present context, a co-construction of epistemologies and research technologies. More recent work has pointed out the ways in which particular scholars or "instrumental communities" in the sciences may reject the expected uses of technical devices completely or domesticate them for their own purposes.⁵

This paper experiments with taking the enterprise a step further. It shows, first, that a case like Hirsch Weir's study of infant monologues deserves to be examined for its creative, epistemologically wide-ranging, and gender-specific use of magnetic tape recording. Second, I argue that such microhistorical case studies may serve not as an ultimate goal, but as a point of departure for considering the long-term evolution of research tools and application techniques as they intersect in individual cases. I hope to show that scientific experiments, methods of investigation, and research technologies never emerge in a historical vacuum, nor can they retrospectively be regarded as closed experimental systems or attributed the status of a techno-epistemic *a priori*. Accordingly, this paper considers tools and practices of research that are widely dispersed historically, but collaborate over a long century within personal, media, and discursive networks in pursuit of the interior monologue.

Crib talk on tape: linguistics at home

Ruth Hirsch Weir was among the few successful female linguists of her time. The introduction to her book *Language in the Crib* presents a fairly modern household, with childcare shared between both parents and a nanny, and a concept of language education that involved almost no baby talk (Hirsch Weir 1962, 25). Having emigrated from Czechoslovakia in 1947, at the very beginning of the Cold War, Hirsch Weir did not speak either of her mother tongues (German and Czech) with her children. Yet full assimilation was not her goal. She was intrigued by the diversity of linguistic varieties that her two-and-a-half-year-old started to imitate: the East Coast English of his Boston-born father, his mother's strong Eastern European accent, and the nanny's British English with a Swedish accent (Hirsch Weir 1962, 25). Not only did Hirsch Weir's linguistic work profit from making this household an object of research, but her audacious and inventive use of theories, methods, and research tools from a wide range of disciplines probably also helped her build her career in a still male-dominated field.

Hirsch Weir experimented with tape recordings right from the start of her career in the 1950s. Initially, she developed methods for the didactic use of tape recordings in school and university language teaching, and was seen as one of the founders of the emerging field of applied linguistics.⁶ With *Language in the Crib*, she put tape recording to a different use, as an intimate medium of eavesdropping. She describes her technique in detail: Anthony lay in bed in his unlit, 144 square-foot room, which had two bare plasterboard walls, one glass wall, a plywood ceiling, and vinyl flooring. The microphone was positioned two feet away from his crib, connected to the recording device in the hall by a long cable (Hirsch Weir 1962, 27). Anthony did not know about the recordings, but picked up the word "microphone" and used it twenty-three times in his monologues – just as often as the word "milk" (Hirsch Weir 1962, 96).

As has recently been noted, magnetic tape supplanted what media historians often call the "phonographic regime", with its media logic of inscription and conservation, and offered instead a "tape-particular system of buttons and spool-mechanisms" (Bohlman and McMurray 2017, 4, 8). The advent of portable, affordable tape recorders in the 1950s and 1960s made this new technology ubiquitous, ushering in a craze for "sound hunting" as private individuals began to record everything that crossed their microphone's path:

the drone of their sports car's engine, music-making in their home, their children's first words (Figure 1) (Bijsterveld 2004).

Four- to eight-track tape technology, with its long recording times and easy options for winding material forward and back, speeding it up, slowing it down, pausing, and overwriting also opened up new horizons for scientific research. In linguistics, it was above all linguistic anthropologists who fostered the establishment of large tape archives in the

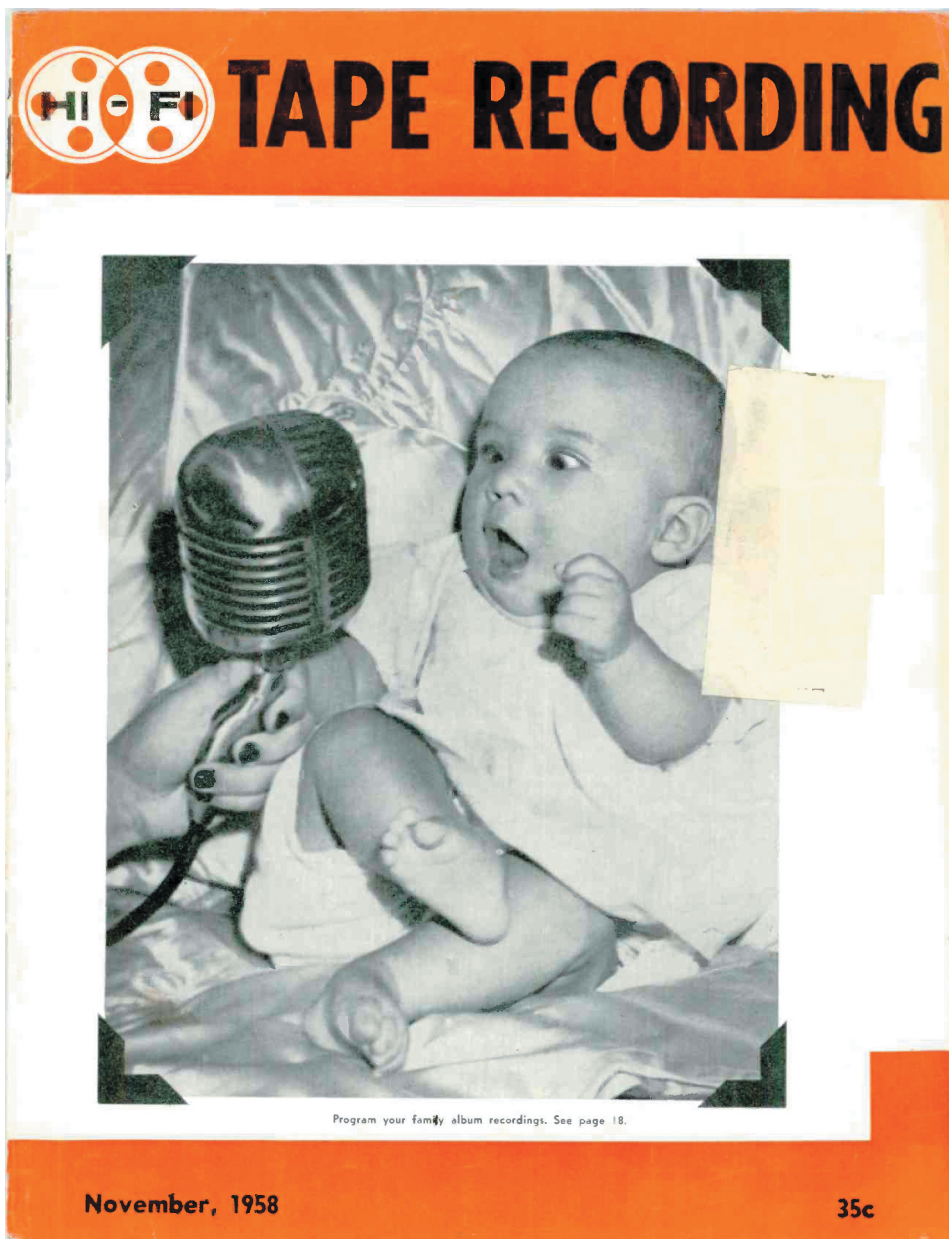


Figure 1. Cover of *Tape Recording*, November 1958.

United States for the comparison of spoken languages from around the world.⁷ But Hirsch Weir's particular use of magnetic tape was still a creative innovation in her discipline. For her experimental setting, she chose to employ two recording devices. One was the Ampex 960, a high-end mobile device for home use produced from 1960, combined with the then popular tube amplifier Dynakit Stereo 70;⁸ the other was the Magnecorder PT6A, used since 1948 by radio studios, the military, and university fieldworkers.⁹ Hirsch Weir complemented these with an Electro-Voice microphone and Scotch-brand tapes (no. 111) (1962, 27).

Hirsch Weir nevertheless complained of the “less than perfect recording conditions, in spite of the quality of equipment” (1962, 24). Her experimentation with different devices and her omission of certain kinds of information (on volume, for example) means we cannot reliably replicate the quality of the recordings, but I tentatively reconstructed Hirsch Weir's application scenario, with the part of Anthony taken by a six-year-old English native speaker, to at least better understand the challenges posed by her trial-and-error method.¹⁰ For the Magnecorder with a tape speed of 7.5 ips, it is possible to assume an approximate frequency range (20–6,000 Hz) and signal-to-noise ratio (approx. 40 dB). Because the overtone spectrum is filtered out above 6,000 Hz, consonants become blurred. It is impossible to distinguish a voiced from an unvoiced “S,” for example, whereas variations in pitch (stress, rhythm, and intonation) emerge if anything more clearly than in better-quality recordings.

My finding regarding the blurred consonants tallies with comments on the poor quality of the recordings noted down by Hirsch Weir on the transcriptions of her nine tapes (1962, Appendix, 157–212). In fact, the poor signal-to-noise ratio almost paradigmatically marks a turning point in phonology during her time. In the 1950s, Roman Jakobson had been most interested in the possibilities offered by meticulous spectrographic analysis of linguistic material (Jakobson, Fant, and Halle 1951, 40–41). But in the 1960s, he argued that linguistics should not only be flanked by phonetics (the spectrography-based science of the acoustic characteristics of a speech sound) but consider phonology an approach in its own right, concerned with the “linguistic functions performed by sound” within a linguistic system (Jakobson and Halle 1962, 467). In this context, Jakobson explicitly highlights high-fidelity tape recording as a new means to study the particular “emotive cues that easily undergo linguistic analysis,” and, more generally, the metrical and prosodic structure of a given language (Jakobson 1960, 355, 373). This approach inspired him to sketch out his now famous model of the six functions of language, referential, conative, phatic, emotive, metalingual, and poetic, which are amenable to analysis with the help of grainy tape recordings (Jakobson 1962b).

It was against this backdrop that Jakobson praised Hirsch Weir's study as the gateway to a “fascinating and hitherto unexplored province of language” (Jakobson 1962a, 18).¹¹ Anthony's “genuine soliloquy, the speaker's *privatissimum*”, he argues in his foreword to *Language in the Crib*, brings research on language acquisition “a step nearer to true inner speech, namely, to its hidden and perplexing variety, the speech in dreams” (Jakobson 1962a, 18). The toddler's semi-wakeful state reduces the power of cognitive and referential speech in favour of emotive, metalingual, and poetic capacities, which are more closely interconnected in children than they are in adults. Anthony's monologues are “self-educational linguistic games” and bear a “striking resemblance to the grammatical and lexical exercises in textbooks for self-instruction in foreign languages” (Jakobson

1962a, 20, 19). At the same time, they contain poetic linguistic games with verb forms, “*Fix the music – Music is fixed ... – Cobbers crossed the street – Cobbers always cross the street*”, or with syntactical operations such as the stepwise completion of sentences: “*Anthony take the – Take the book ... This is the – This is the – Book ...*” (Jakobson 1962a, 19, 20. Original emphasis).

Hirsch Weir confirmed this interpretation by stressing that high-quality tapes were crucial for her work because she analysed Anthony’s “crib talk” in terms not only of grammar and discourse, but also of phonology – the sound system of her son’s language, or more precisely “the phonemic contrasts utilized in the child’s language on the one hand, and the phonetic variations used in different circumstances within the child’s phonemic range, on the other” (1962, 21). Hirsch Weir discerned in Anthony’s crib talk what Jakobson called the poetic function of language – most noticeable in the child’s prosodic language use, his play with words and rhymes (1962, 103). For example, the alliteration “Daddy dance” recurs eight times in the child’s monologues (Hirsch Weir 1962, 105, 138–41). And even short sequences, Hirsch Weir argues, indicate Anthony’s pleasure in playing with alliteration, assonance, rhythm, intonation, substitution: “*Bobo’s not throwing/Bobo can throw/Bobo can throw it/Bobo can throw/Oh (2x)/Go (3x)*” (1962, 120).

For Hirsch Weir, her mentor Jakobson’s theory of language was only one way to understand Anthony’s pre-sleep monologues; I will return to her further interpretations of the tape recordings below. As we have seen, magnetic tape recording had become a frequently used technology in 1960s linguistics. But methodologically speaking, Hirsch Weir’s application of the technology still stands out in her discipline: first, because she introduced to linguistics an experimental application technique of tape recording that allowed her to leave her test subject seemingly alone in his room; and, second, because of her experimentation and tinkering with the technology available at the time. In both respects, she may have taken inspiration from the neighbouring field of psychology.

Techniques of eavesdropping in psychology

Experimental observations of child-directed speech started to attract intense interest among developmental psychologists in the late nineteenth century. The psychologist Carl Stumpf, for example, tracked the halting but ultimately successful development of language in his son Felix in the 1880s, unnoticed by Felix himself, and recorded it in his diaries (Stumpf 1901). Psychologist William Stern and his wife Clara Stern, too, in 1907 stated that they had observed and playfully experimented with the linguistic development of their three children Hilde, Günther, and Eva for many years in such a way that the children were not conscious of their role as experimental subjects. “We were perfectly well able,” reported the Sterns, “to keep the children unaware of the situation; our eldest daughter, now seven, still has no idea that notes are constantly being made about her and her siblings. We believe that this unwittingness is absolutely imperative for the investigation” (Stern and Stern 1907, iv). The Sterns wrote down their observations in a journal every evening, or transcribed them in shorthand when the exact wording was important. They remarked that a phonograph would have been useful, especially for the elements of babbling such as “chuckling, gurgling, clucking, and spluttering sounds,” which are more difficult for adults to imitate or to set down faithfully in writing (Stern and Stern 1907,

148). The actual use of a phonograph to research child language can be inferred from an old inventory list of the Phonogramm-Archiv in Berlin, which mentions 1912 recordings made by the psychologist Otto Abraham of his son (“Robert screaming”).¹² And in the 1920s, the Swiss psychologist Jean Piaget systematically observed children’s language development, with the help of numerous colleagues and unbeknown to the children themselves, at the *Maison des Petits de l’Institut Rousseau* in Geneva (Piaget 1959, 3).

Piaget’s work at the *Institut Rousseau* will be addressed in more detail below. For now, it is important to note that Ruth Hirsch Weir’s covert observation of her child may have been influenced by Carl Stumpf, the Sterns, and Jean Piaget in applying both established and new media for the observation of child language development in some hidden form. However, whereas most of the women involved in these earlier projects provided their services “beyond the academy” (von Oertzen, Rentetzi, and Watkins 2013) – as scientists’ wives (like Clara Sterne) or nursery-school teachers (at the *Institut Rousseau*) – Hirsch Weir combined a position at Stanford University with her role as a mother of three.

Concerning the method of eavesdropping, Hirsch Weir may have taken additional inspiration from the covert use of audio technology in contemporary psychotherapy. A pioneer in this respect was the American psychologist Carl R. Rogers, founder of a person-centred therapy that relies on patients’ power to restructure their behaviour in the process of therapy (1942a, esp. 122–26). As early as the 1940s, Rogers started using gramophone recording of therapeutic conversations as an objective method of documentation for teaching, and also played the recordings back to patients during later sessions (1942a, vii–ix, 261, 435). He and his student Bernard J. Covner reported on their use of phonography at Ohio State University, where about a hundred therapeutic interviews were recorded in 1941. They found the material especially useful for studying certain forms of therapy, such as play therapy with children, or for analysing phenomena such as patient insight, antagonism, or resistance (Rogers 1942b, 430). Tailored audio technologies were developed to facilitate the recordings – among them nondirectional microphones, which needed to be placed near the participant’s mouth in order to register every verbal expression (Covner 1942).

In 1948, the British social psychologists Joshua Bierer and Rolf Ström-Olsen reported the first use of a magnetic steel-wire recording apparatus that enabled recording for about an hour in psychotherapy. They found that the wire could be reused for recording, and by stitching together different wire pieces, a selection of recordings could be played back in lectures. This recording technology enabled Bierer and Ström-Olsen to introduce new methods of treatment, such as leaving patients alone with the phonograph to record and study their own behaviour. They also used magnetic tape recording as a means of self-confrontation, to correct the patient’s memory, and to retrospectively confront patients with subconscious material they had produced under narco-analysis (Bierer and Ström-Olsen 1948).

In the 1950s, the advocates of sound recording in psychotherapy faced complaints from their colleagues about the technical limitations of recording devices, the absence of visual gestures and silent weeping, or blank pauses on recordings (Redlich, Dollard, and Newman 1950, 44; Brody, Newman, and Redlich 1951). To avoid disturbing patients and therapists, various ways of hiding the microphones during sessions were considered, for example behind table lamps or chandeliers, and special studios were designed to record and observe psychoanalytic interviews inconspicuously (Mahl, Dollard, and Redlich 1954,

238). Psychotherapists thus worked not with a single technology, but with a great variety of specially modified and applied recording devices.

In terms of the technology in use, and to some extent also methodologically, there is a thread leading directly from the largely covert use of audio technology in psychotherapy by Carl Rogers, Joshua Bierer, and Rolf Ström-Olsen to Hirsch Weir's research. By darkening the bedroom and hiding the tape recorder in the hall, the linguist Hirsch Weir ensured that her son would forget the microphone and abandon himself to crib talk. In methodological terms, however, Hirsch Weir's aim was not to mimic an "echo therapist" in Rogers's sense with a tape recorder, or to deploy tape recording technology as a tool for patients' "abreaction", "re-enacting", "re-experiences", or "confrontation", as Bierer and Ström-Olsen had done (Bierer and Ström-Olsen 1948, 957–58). Hirsch Weir did not retrospectively confront her son with the recordings but created a cosy environment in which Anthony felt at home and started to speak.

Analytically, Hirsch Weir departed even more profoundly from the psychotherapeutic theories of her contemporaries. In fact, she partly interpreted Anthony's monologues by returning to the work of Sigmund Freud, a much-criticised figure in both psychotherapy and linguistics at the time. Hirsch Weir unwaveringly offered an interpretation of Anthony's enjoyment of his play with apparently nonsensical words as an articulation of the unconscious, citing Freud's *Jokes and Their Relation to the Unconscious*: "There is linguistic sense in the child's nonsense" (Hirsch Weir 1962, 22, 146). She describes the monologues as "dialogue[s] with imaginary interlocutors" that reveal Anthony's relationship with his baby brother, other family members, friends, the family's pets, and his toys (Hirsch Weir 1962, 23).

In addition, Hirsch Weir draws on earlier theories in linguistics and regards Anthony's crib talk as the externalisation of an "inner language" – inner language defined, with Lev Vygotsky, as a kind of inner dialogue, which is "perhaps the primary form of language" (Hirsch Weir 1962, 7, 22). The inner dialogue, argues Hirsch Weir, produces the metalingual knowledge (in Vygotsky's sense) that is a prerequisite for external speech.

That Hirsch Weir chose to bring together the linguistic models of Vygotsky and Jakobson and the psychoanalytic theories of Freud may seem puzzling at first, in view of their theoretical discrepancies. But, actually, it was crucial to Hirsch Weir's bold attempt to combine new readings of theories in the study of inner language with the application of tried-and-tested methods. To explain this point, I will first jump back in time to one of the earliest studies of inner language, *Le langage intérieur* (1886) by the French physiologist Gilbert Ballet, upon which both Freud and Vygotsky drew in their very different ways. Especially for Freud, Ballet's theoretical insights were as important as his multiple methods of examining inner language. I then come back to Vygotsky's and Hirsch Weir's studies on inner language, before turning to the reception of their work from the 1960s onward.

Provoking inner language: physiology and psychoanalysis

Le langage intérieur was Gilbert Ballet's professorial dissertation, completed in 1886 under the celebrated Parisian neuroanatomist Jean-Martin Charcot at the Hôpital de la Salpêtrière (Ballet 1888). It was not Ballet's first encounter with the theme; he had already studied patients' ability to speak under hypnosis in the hope of discovering more about

their “internal language”. In that research, Ballet drew on his teacher’s neuroanatomical brain studies and observations of patients suffering from aphasia. On that basis, Charcot had postulated the existence of three memory centres (visual, acoustic, and motor) and paths of association between them in the human brain, believing these to enable the use of language (Charcot [1878] 1889).¹³

Ballet attempted to confirm Charcot’s findings by means of in vivo experiments – that is, not through post-mortem examinations, as neuroanatomists had previously done. For these experiments, Ballet again built on Charcot, who used specific tools of “induced observation” (*observation provoquée*), in some cases flashes of light, to provoke a state of “grand hysteria” in his patients.¹⁴ Ballet used the same method to first stimulate his patient’s left eye only (Figure 2). The right hemisphere passed into the hypnotic state; the patient was still able to externalise her thoughts – she could answer questions, recite verses, and sing. Ballet then stimulated her right eye, deactivating the left hemisphere, and the capacity for language was deactivated. Although it might not be possible to localise particular language centres using this method, argued Ballet, it *was* possible to confirm the neuroanatomical assumption of the left hemisphere’s significance for language (Ballet 1880).

For the present purposes, Ballet’s inventive use of the method of induced observation to externalise and localise inner language faculties is particularly interesting. Ultimately, though, Ballet found that method unsatisfactory for the more detailed study of inward language, and in *Le langage intérieur* he turned to the technique of self-observation or introspection, examining moments of “quiet thought, in the silence of the study” (1888, 20). Introspection, let alone retreat into the study, was considered completely outdated at the Salpêtrière (Charcot 1887, 1, 118), yet Ballet closed the door and listened to his inner voices. By observing himself in quiet moments, while reading or before falling asleep, Ballet found, copying Charcot’s model, that inner language arises out of complex associations between acoustic, visual, and motor images. But for Ballet, acoustic images took on a special role, as constant and necessary accompaniments to outward speech. “The mental hearing of words takes its components from the collection of auditory word-images that we have acquired,” he observed (Ballet 1888, 27). Inner speech is thus fully identical neither with one’s own voice nor with the voices of others: we hear ourselves speak in the voices of friends, colleagues, famous actors. According to Ballet, inner speech unfolds a life of its own and occasionally takes on more tenacious forms that border on auditory hallucination (1888, 22). Nevertheless, this inward speaking is a constant and necessary accompaniment to outward speech. It is a partially unconscious linguistic technique (Ballet 1888, 20–21).

In the quiet of his study, Ballet turned not only to introspection, but also to classical writings – another practice much derided at the Salpêtrière, where there was thought to be “no sort of reason for going in search of any addition to modern science through knowledge of the ancients” (Bernard [1865] 1927, 142). Ballet, in contrast, tracked the topos of “inner language” far back into the history of philosophy, to the rich seam of debate over what comes first: human language or innate ideas. Ballet tended towards the view of eighteenth-century philosopher Antoine de Rivarol, who asserted the existence of ideas and faculties prior to language, but regarded the higher forms of thought as dependent on an inner capacity for speech (Rivarol 1784, 18–19).¹⁵



Planche XXXVII.

CATALEPSIE

PROVOQUÉE PAR UNE LUMIÈRE VIVE

Figure 2. Désiré-Magloire Bourneville and Paul Regnard, *Iconographie photographique de la Salpêtrière (Service de M. Charcot)* (Paris: Aux bureaux du Progrès medical, 1879–1880), 3: Plate XXXVII.

Far from leafing through the dusty classics only in search of philosophical counsel, Ballet also used classical writings as patient notes, records of introspection, and confirmations of his theory. In his 1899 psychobiography of the alleged mystic Emanuel Swedenborg, for example, Ballet paid particular attention to Swedenborg's own description of his "langage cogitatif" made up of visual, motor, and, especially, acoustic hallucinations (Ballet 1899, 128).

Ballet's work is significant here for both its theory of inner language and its frequent changes of research method. To investigate inner language, the French physiologist started with the anatomical study of language faculties, then moved on to experimental hypnotic work on living patients and a philosophically informed psychological self-observation, then to the study of texts in the history of philosophy and medicine.

Sigmund Freud's work on the language of the unconscious owed its emergence to a mix of methodological approaches no less remarkable than – and partly inspired by – Ballet's. Freud visited Paris in 1885, at a time when Ballet was *chef de clinique* at the Salpêtrière. Freud was initially intrigued by Charcot's neuroanatomical localisation of language centres. But by the time he wrote his study on aphasia in 1891, he had already rejected Charcot's views, believing the human nervous system to be more complex, more dynamic, and more plastic (Freud [1891] 1953, 54–55). Freud was, though, fascinated by the internal momentum of associations, as described by Charcot, Ballet, and others, and especially by the involuntary emergence of inner language as associations (Freud [1891] 1953, 78, 89). Echoing Ballet, Freud also argued that the "associative activity of the acoustic element" was decisive for the formation of inner "word images" ([1891] 1953, 90, 99) – a claim that would later form the foundations of his theory of the unconscious.

Crucial in this respect is Freud's famous statement in "The Ego and the Id" (1923) that "the ego wears a 'cap of hearing' – on one side only, as we learn from cerebral anatomy. It might be said to wear it askew" (Freud 1923, 25). By fitting the ego with a hearing cap, Freud stressed its constant availability for acoustic signals from the exterior world, which it then transfers to the superego. The resulting word-images, Freud explains, are derived from auditory perceptions and internal thought processes. The unconscious thus becomes perceptible – that is, audible – through word-images, a form of inner speech.

As is well known, this theory informed Freud's practice of psychoanalysis with its focus on people suffering from psychic illness, where word-images arise from misrouted or destructive associations. To identify such associations, Freud (again much like Ballet) worked with methods of self-observation and literary analysis, analysing his own writings, his patient's dream records and diaries, and the associative prose of famous writers.

Later, Freud preferred to make his predominantly female patients *speak*. In his talking cure, the patient's speech was provoked not by flashlights, as in Ballet's earlier treatments, but by Freud's own voice and an unchanging communicative situation: in the office at Berggasse 19, the patients lay down on the now famous couch and had no eye contact with Freud (Freud 1923, 28).¹⁶ For the patient, the sense of speaking to him- or herself let loose a veritable river of words, as the unconscious began to speak. The physician listened to his patient's "free associations" with evenly suspended attention (Freud 1924, 40), focusing not so much on the intended speech as on slips of the tongue, misplaced words, throat-clearing, sudden hoarseness, or vocal expressions of traumatic affect and symptomatic speech more generally (Freud 1912a, 263).¹⁷

Freud admitted the difficulty of remembering the large amounts of data gathered during a therapeutic session, but he refused to use any mechanical recording devices, fearing that the presence of a third party, even a pen or a phonograph, could distort the behaviour of the patient or the therapist. Instead, he made his written notes at the end of his working days, arguing that his memory and paper archive were trustworthy to a “high degree” precisely because they were “not absolutely – phonographically – exact” (Freud 1905, 10).¹⁸

Freud thus regarded psychoanalysis as a method of externalising the patient’s unconscious speech. Instead of interpreting the patient’s speech directly, however, the physician was to internalise the patient’s flow of words, register the utterances word for word, and then unconsciously create cross-connections over a long period of time (Freud 1912b, 116). Psychoanalysis in the wake of Freud celebrated the therapist, who modified the traditional method of introspection by internalising the patient’s speech and then listening to it with an inward “third ear” (Reik 1948). From the 1930s, however, critics accused psychoanalysis of depending too heavily on the perception of the therapist, who might miss critical material or misinterpret the patient’s speech.¹⁹ This critique was rearticulated by psychotherapists such as Carl Rogers, who was one of the initiators of the patient advocacy movement of the 1950s and 1960s.

Ruth Hirsch Weir, in contrast, took up Freud’s work rather uncritically. In *Language in the Crib*, she mentions none of the contemporary critics of Freud. In terms of gender, though, Hirsch Weir inverted the roles of the male physician and female patient, as defined by eminent figures like Charcot, Ballet, and Freud. It was now the female linguist who paid evenly suspended attention to a little boy’s pre-sleep monologues. Writing in the 1960s, this Stanford linguist interprets her son’s wordplay as he talks himself to sleep partly as unconscious associations. She refers, for example, to the prohibitions that Anthony processes in his crib talk: “Don’t touch Mommy Daddy’s desk/I should/he say so (2x)/Don’t go on the desk/Don’t take Daddy’s glasses/Don’t take it off/Don’t take the glasses off” (Hirsch Weir 1962, 121). Or she points out how Anthony represses his fear of the loud noises of trains by thinking about airplanes quietly bubbling through the sky: “Train/Antony can see the plane/Plane (2x)/See bubble” (Hirsch Weir 1962, 125–26). Yet rather than examining Anthony’s pre-sleep monologues solely for psychoanalytical purposes, Hirsch Weir additionally returned to questions posed by developmental psychology and linguistics.

Theorising inner language anew: developmental psychology and linguistics

In Hirsch Weir’s view, Anthony’s crib talk revealed not only emotional states, but most of all a growing sense of the functions of language. As well as Roman Jakobson’s theory of the plurality of language functions, Hirsch Weir was particularly interested in the work of the Swiss developmental psychologist Jean Piaget, mentioned above, and its reception by the Russian linguist Lev Vygotsky.

From his covert observations at the Institut Rousseau in Geneva, Piaget had deduced that children aged between four and eight for the most part (in around 45% of cases) talk aloud to themselves and enter into an imaginary dialogue for which he coined the term “ego-centric language” (Piaget 1959, 5, 21, 44). In Piaget’s view, this egocentric talk represents a “syncretism of thought”, in other words, a non-discursive (or not yet

discursive), fragmented, imaginary form of thinking that is entangled with associations and analogies, dreamlike, and thus “pre-social” (1959, 76, 94). Egocentric talk serves mainly the formation of the self. Around the age of seven, this “primitive and infantile function of language” enables and is replaced by social, analytical, and logical thought and “communicated intelligence” (Piaget 1959, 23, 28). Among adults, such “audible soliloquies” appear only rarely, in phases of unconcentrated reverie, daydreaming, or illness (Piaget 1959, 1, 10).

In *Thought and Language* (1934), Vygotsky criticises Piaget’s association-based interpretation of egocentric language, and indeed more generally the associationist theory of language propounded by child language researchers and psychoanalysts alike. Associations, Vygotsky demurs, predominate only in the very earliest child language, in a period where the word is still treated as “a property of the object” (2012, 64). At this stage, words are still adjectival, are the characteristics of things; natural complexes of words arise in the memory. This phase marks the young child’s entrance into the social environment of language, as language is tried out playfully (Vygotsky 2012, 119–22).

The language of older children and adults, in Vygotsky’s account, is based mainly on arbitrary signs whose meaning arises not from things, but from the signs’ location in the language system. They are what enable abstract thought. This language is accompanied, and indeed made possible, by an inner language that is not merely “speech minus sound” (Vygotsky 2012, 2, 238) but a language in its own right – with its own structure, function, and sound. According to Vygotsky, inner language is neither social language nor egocentric language (what Piaget describes as speaking to oneself before an audience), but an “abbreviated and incoherent” metalanguage that determines thought (2012, 250). Inner language is thus structurally influenced by, but distinct from, the external language of the environment; and it is a precondition for the human faculty of language. The child discovers and develops his or her inner language only gradually, but it is already present from the age of approximately five (Vygotsky 2012, 119–22).

According to his daughter, Vygotsky’s assertions were based in part on his observation of his own two children in the cramped quarters of the family’s home (Vygodskaja 2000, 240–41). In fact, Vygotsky’s more general search for a new socio-historical and only partly Marxist psychology having been received very critically in the Soviet Union, none of the Moscow institutions he worked for gave him an office for undisturbed reading and writing. The linguist thus made a virtue out of the necessity of working from home (Keiler 2002, 34–35).

Hirsch Weir’s home-based science was more of a free choice. Taking up the approaches of both Piaget and Vygotsky, Hirsch Weir succeeded for the first time in tape recording a sleepy toddler, thanks to a creative experimental system. She argued that it was already possible to hear “inner speech”, in Vygotsky’s metalingual sense, in her small son’s crib talk, and thus considerably earlier in the schedule of psychological development than Vygotsky had supposed. Although this inner language does not explicitly demand an interlocutor, according to Vygotsky it is oriented on the conative (appellative) function of language – which is why Hirsch Weir also calls it a “dialogue spoken by a single person” (1962, 146). For Hirsch Weir, this semiotic interpretation of inner speech using Vygotsky and Jakobson did not preclude interpretations based on associationist and psychoanalytical theories such as those of Piaget and Freud (and previously Ballet).

Despite, or perhaps because of, its theoretical pluralism, Hirsch Weir's study met with an enthusiastic reception in her own discipline and beyond. Roman Jakobson's support probably played quite some part in that. In a letter of October 1961, discussing a lecture tour of Europe, he wrote: "I made a great publicity of your work on your son's monologues and I saw linguists, psychologists, psychoanalysts just fascinated and waiting eagerly for publication" (Letters 1961a). In November 1964, he remarked on "all the warm reviews of your meritorious book," and added: "I am looking forward to further cooperations" (Letters 1964). In May 1965, finally, Jakobson referred to a conversation with Hirsch Weir's publisher, Peter de Ridder, who had been "agreeably surprised by the great demand for your and Anthony's book" – Jakobson himself was "not surprised, but very pleased" (Letters 1965).

Infinite speech and philosophers of the real

The French philosopher Jacques Lacan, too, was intrigued by Hirsch Weir's tape recordings, and mentioned her work immediately after its publication, in the course of a seminar on anxiety, entitled "L'Angoisse" and held in winter 1962/63 at the central psychiatric hospital Sainte-Anne in Paris. It is worth recalling very briefly some of Lacan's leitmotifs and especially his theories of language, speech, and the voice.

In *Anxiety*, Lacan refers to three functions of language. First: according to Lacan, the human subject experiences itself as a split ego from infancy. Through "instruments of communication" (Lacan 2014, 272), most prominently the mirror, it perceives itself as a corporeal and psychological unity, which is how, from that moment on, it will imagine and yet misrecognise itself (Lacan 2014, 59). Language, the "big Other" (*l'Autre* with a capital A), is another such instrument of communication. Language is the guarantee of the symbolic, of orderliness, of law. It structures the unconscious subject (*je*) and gives it an identity in language (*moi*). Usually, this function of language operates unnoticed. The subject mirrors and misrecognises itself in imaginary speech – in an empty conversation of self-mirroring that, contrary to appearances, does not originate in the subject itself but comes from outside: from language, the Other.²⁰

Second: behind this empty speech (*parole vide*) looms an unsatisfied desire for immediacy, for a "Real" that eludes the subject. Only here and there can irreducible remainders of the Real be found – for example in the form of the "voice", by which Lacan does not mean a voice in the literal sense, but that which is excluded from structured, intentional speech and remains misrecognised, yet can be perceived in exceptional situations (2014, 244–52). Most such situations are frightening, like the auditory hallucinations and internal conversations of psychotic patients, who hear numerous repressed voices all at once (Lacan 2014, 251). These, argues Lacan, are precisely the moments when language reveals its underpinnings and transmits "signals of the Real" (2014, 157).

And third: language may also reveal its structures in gentler ways, by addressing the unconscious and thus freeing the subject from the cycle of imaginary self-misrecognition. That might happen in moments when language exposes its structure through disruptions or breaks, through pauses, throat-clearing, coughing, slips, or inappropriate word choices. Lacan's fascination with such moments of "full speech" was what later prompted philosopher Jacques Derrida to accuse him of promoting a phonocentric theory of the voice. Lacan, argues Derrida, erroneously attributes a certain truth value to the "presence of the

word”.²¹ For the present argument, however, Lacan’s notion of full speech is of particular interest because it renders the distinction between internal and external speech void. Full speech is what brings out the subject, beyond its linguistic identity and seemingly inner speech.

This aspect of language, writes Lacan, also shows itself in the soliloquies or “autonomous play of speech” performed by very young children (2014, 273). He adds that such “primordial monologues”, in which the child does not so much talk to itself as language talks to the unconscious, have recently been captured on tape by colleagues of the linguist Roman Jakobson – a piece of “good fortune”, because we only have this phenomenon “in the state of a remainder, that is, on the tape reel. Otherwise, at the very most we have merely the far-off murmur which might break off at any moment should we appear” (Lacan 2014, 273, 274). Although he did not name her directly, Lacan was clearly referring to Ruth Hirsch Weir and *Language in the Crib*. Unlike Hirsch Weir herself (following Freud), Lacan did not interpret Anthony’s “hypnopompic monologues” as an articulation of the unconscious, but rather as a conversation between language and the unconscious, with “the constitution of the *a* as a remainder” – a remainder that shimmers through the “voice unfastened from its support” (2014, 274). Nevertheless, it was Hirsch Weir’s study that inspired Lacan to continue deliberating, in his seminar on anxiety, about the disconcerting effect of hearing oneself on tape (further exacerbated by the poor signal-to-noise ratio of tape recording at the time), not recognising one’s own voice but perceiving it as that of a stranger “with a foreign sound” (2014, 276) and hallucinating it as a disembodied appeal, similar to the psychotic hearing of alien voices and different from the jubilant recognition of the self in the mirror. For Lacan, the tape recorder was thus a technology that disillusioned, that disrupts the speaker’s imaginary image of her- or himself.

It was probably for this reason that Lacan carried out some sort of re-enactment of Hirsch Weir’s experiments, the test subject being Lacan himself. As early as 1958, Lacan is said to have permitted his audience to record his lectures on tape; and his listeners apparently did so, half-secretly, without Lacan noticing it. Starting from the seminar on anxiety, several recordings survive and can be found online.²² They allow us to listen to Lacan’s loud delivery, interrupted by coughs and pauses, full of ellipses, puns, and ambiguities. They are performative experiments in conversing with the Other (“A”), which challenge language itself as much as the audience. When Lacan opened the *École française de psychanalyse* in June 1964, it seems that he even had a tape speak to the guests before he stepped out from behind the curtain (de Certeau 1987, 278–80; Szendy 2003).

The French philosopher Michel de Certeau, and later the media scholar Friedrich Kittler, regarded the tape recorder as Lacan’s ideal listener. “The master” was speaking, wrote Kittler, but “needless to say, not to the countless people, women and men, who filled the lecture hall of Sainte Anne. They were not even listening; they only wanted to understand.” The tape, in contrast, was “capable of inscribing into the real a speech that passes over understanding heads” (Kittler 1997a, 50). There has been much discussion and criticism of Kittler’s reading of these tapes, and more generally the shift of the Lacanian *Real* towards a technologically processed, encoded and stored *real* (see Hansen 2015). What certainly is convincing in Kittler’s interpretation, however, is his proposal to regard Lacan’s seminars as infinite monologues, as conversations of the self with language, as a sliding of a language that constitutes but misses its subject – in fact, as what computer

programs in the 1960 promised to produce through endless loops of non-communication (Kittler 1997b).

Pushing Kittler's argument even further, we may draw parallels between Lacan's use of tape recording in his seminars and early experiments with computer programs in psychotherapy. It was Carl Rogers's client-centred method that defined a well-known psychiatrist script for the computer program ELIZA, created by Joseph Weizenbaum in 1966 for the MAC time-sharing system at MIT. The script DOCTOR, based on ELIZA and written by Bernie Cosell for Bolt, Beranek and Newman (BBN) in the programming language Lisp in 1966, would become famous (Weizenbaum 1966). The program aimed to draw the user into a sustained soliloquy. Interaction with the user took place by means of a typewriter connected to the computer. The user entered a sentence, which the program searched for key terms (such as "I am unhappy"). Having identified the most important term (such as "unhappy"), the program analysed syntactical and lexical contexts. It came up with a response by associating these key terms with synonyms or hypernyms, or posed rhetorical questions ("Do you think coming here will help you not to be unhappy?") to which the user responded, and so on (Weizenbaum 1966, 38, 39).

As is well known, Weizenbaum was irked by practicing psychiatrists such as Kenneth Mark Colby, based at Stanford, who tried to actually apply PARRY, another program modelled on ELIZA (Colby, Watt, and Gilbert 1966; Weizenbaum 1975, 269–70). Yet in view of these new approaches in psychoanalysis in the 1960s, Weizenbaum's dismissive response to a therapist who saw himself "not as an engaged human being acting as a healer, but as an information processor following rules" appears just as misplaced (1975, 6). After all, the methods of Colby, and previously Rogers, did not aim to comprehend, understand, or decipher in the sense of Freudian psychoanalysis. Rather, they wished to induce new forms of non-communication, with users talking to themselves in infinite loops.

Thus, to put the point perhaps rather strongly: in the mid-1960s, Lacan applied tape as his ELIZA or PARRY. In contrast to the affordances of tape technology in the 1960s, the sound recordings of Lacan's seminars were never supposed to end. They were to speak to and about only language. If Hirsch Weir used magnetic tape recording to study her son's infant monologues (understood as a quasi-interior monologue), Lacan used the same technology to produce infinite monologues in search of a signal from the unconscious subject.

Taking crib talk back to linguistics and developmental psychology

Hirsch Weir's research was brought to a premature end by her sudden death in November 1965, but her correspondence with Jakobson indicates that she had also recorded the speech of her younger children, David and Michael, and was planning to analyse it (Letters 1961b). Her methodology of covert, tape-based observation of her own children found many admirers besides Lacan, in the more positivist field of linguistics. In 1970, for example, linguist and language teacher Helene Harrison, based at Southwest Texas State College in San Marcos, investigated her young daughter Dawn's "periods of extensive language practice" shortly after waking up (Harrison 1970, 344). As well as the written documentation, Harrison worked with a total of four hours of tape recordings: thirty minutes of material recorded at twenty-eight months and three-and-a-half hours

recorded at thirty-one months (1970, 345). Harrison joined Hirsch Weir in stressing the benefits of long-term recording, and was deeply impressed by the small child's considerable metalingual and poetic abilities (1970, 345, 360–361). In 1983, Stan Kuczaj, a child psychologist and later expert on dolphin communication, also drew inspiration from Hirsch Weir. In *Crib Speech and Language Play*, he compares the social speech and crib talk of fourteen children aged fifteen to thirty months in terms of their acquisition of syntactic knowledge (Kuczaj 1983).

The most extensive such follow-up project was initiated by developmental psychologist Katherine Nelson.²³ In 1981, Nelson arranged for Emily, the daughter of two Yale economists, to be covertly tape-recorded speaking to her parents before bed and alone in her crib.²⁴ When Emily was twenty-one to thirty-six months old, five or six tapes per week were recorded, 122 sessions in total. In contrast to Hirsch Weir, Nelson no longer felt any need to describe the tape-recording technology that was used for this 1980s experiment. Emily's mother produced rough transcriptions with annotations detailing the social context. In 2017, the data were uploaded to "Talkbank", a public database for the study of human communication,²⁵ but Nelson had already shared them with a group of New York colleagues in the 1980s – developmental psychologists, linguists, and psychiatrists, all interested in the sociocultural embedding of early language acquisition (Nelson 1989b, vii). This group of researchers moved away from the previous focus on crib talk's role in language formation to examine its cognitive functions. Looking at discursive, grammatical, lexical, and syntactic forms, they found that inner speech differed far more from social speech than had been suggested by Vygotsky and Hirsch Weir (Nelson 1989a, 5–6, 19). In their interpretations, crib talk was a form of "heuristic speech" that helped the child "to represent, to categorize, to explain, as a way of coming to know about the world" (Nelson 1989a, 17). Among the focal points of this collective project were the narrative features of child language – which are the means of developing concepts of past, present, and future; practicing problem-solving; drafting a "narrative self" in relation to revoiced others; and constructing an "inner reality of the self" (Nelson 1989b, vii).

A long story short

This paper has explored a lost sound object: Ruth Hirsch Weir's tape recordings of the crib talk of her son Anthony, produced in 1961. My attempt to reconstruct a short session helped me to understand how central the audiotapes themselves were for Hirsch Weir's approach to interior language. In terms of the technology in use, it seems that Hirsch Weir borrowed the method of covert tape recording from contemporary psychotherapy, especially that of the 1940s to 1960s, when analysis was renounced and both communication and diagnosis left to the patient. In some cases, therapists even had themselves replaced by tape recordings or by computer programs to make their patients talk more extensively and more monologically. Analytically, however, Hirsch Weir returned to the talking cure as defined by Sigmund Freud, extracting from her son's recorded and transcribed language play an associative logic of the unconscious. Freud had rejected any kind of recording device, his objective being to filter, reconnect, reorganise, and understand his patients' monologues in a way no phonograph could have done. This aim was partly inspired by the French neurophysiologist Gilbert Ballet, who sought new means of investigating his own inner language and that of his patients and classic

authors. Ballet was concerned only with describing inner language as an unconscious precondition for external language use – not, like Freud, with developing a technique for analysing the unconscious through a transfer of inner speech from the patient to the physician. What Ballet and Freud have in common, though, is their methodological quest for ways to externalise inner language, whether through hypnosis, retreat into the study, the reading of classic soliloquies, or the physician as a medium for his patients' inner speech.

Hirsch Weir's somewhat eclectic approach allowed her to combine Freud's method of psychoanalytic interpretation with the psychotherapeutic practices of tape recording of her time. This did not prevent her from additionally taking account of Lev Vygotsky's work on inner speech. Vygotsky interpreted inner speech not in terms of associationist psychology, as Ballet, Freud, and Piaget had done, but in terms of semiology. In turn, Vygotsky's theory of inner language was crucial to Jakobson's thinking on the metalingual and poetic functions of language, which he regarded as preconditions of linguistic communication. Hirsch Weir discovered these functions of language at work in the monologues of her son as he fell asleep, and attested a capacity for metalingual and poetic language in very young children that Vygotsky and Jakobson had previously found only in older ones.

Language in the Crib thus expanded the research questions of many different disciplines. Probably to Hirsch Weir's own surprise, Jacques Lacan was among the first to mention her work after its publication. Psychoanalytically and semiotically, Lacan was not interested in an inner language that preceded and shaped outer speech. He dismissed the distinction between internal and external language, and with it the existence of a knowledge or faculty of language that could be expressed solely in intimate conversation with oneself, antecedent to conversation with the Other. For Lacan, metalingual knowledge flashed into view only behind and between the conversation with the Other, or rather at those moments when the border between the subject and the Other has not yet been closed, as in the monologues of infants. In order to make that order audible in his lectures as well, Lacan produced endless loops on tape – not unlike the way that Weizenbaum left it to ELIZA (and, even more so, Colby to PARRY) to entangle the user in endless monologues.

Starting from here, one might further pursue the application of interactive computer intelligence in psychoanalysis, up to the attempts to bring ELIZA into conversation with itself or with other programs, such as PARRY (Garber 2014; Turkle 2011, 105–24). However, I will leave this brief sweep through interior monologue research at the archive founded with developmental psychologist Katherine Nelson in the 1980s, which explicitly set out to follow up Hirsch Weir's project. Whereas psychoanalysis in the 1960s and 1970s had tried to replace the therapist by machine listening, Nelson used magnetic tape recording as a mere auxiliary tool and reintroduced the interpreter, or even several interpreters, to make sense of toddler Emily's crib narrations.

I hope to have shown that in the period between roughly 1880 and 1980, the interior monologue remained something open, a "sonic thing" without a binding definition. Psychologists and linguists approached inner conversations through different hypotheses to describe them as very different forms of knowledge. In their attempts to capture interior monologues or inner speech, they actively and fully exploited the operative potential of their research tools. They applied, reconstructed, or tinkered with standard

media technologies in idiosyncratic and tailored ways. Turning technologies into prostheses of their hypotheses, they used flashlights, couches, cribs, diaries, phonographs, tape recorders, and computer programs as instruments to stimulate or eavesdrop, as echo instruments, as endless programs. It was along the contours of these research tools and application techniques that forms of knowledge and disciplinary distinctions took shape out of media-documented, observed, or induced internal monologues.

Notes

1. Stanford University Biographical Files Collection (Collection no. SC1136), Box 33, Folder 94 contains a memorial resolution on the occasion of her death in November 1965 and some more bibliographical information. The MIT Libraries Archive ([Jakobson Papers, Collection ML 12, box 41, folder 3](#)) holds twenty-two pages of correspondence between Ruth Hirsch Weir and Roman Jakobson.
2. I refer here to my email correspondence with Anthony Weir between July and October 2016.
3. For a more comprehensive history of ideas on “inner speech” see Meier-Oeser (2004); for a broadly conceived essayistic reflection on “inner speech” see Riley (2004).
4. On “sonic things” as “epistemic things” see the Introduction to this Special Issue.
5. On “instrumental communities” see Mody (2011).
6. See Hirsch Weir (1953). In a letter to Jakobson dated 4 November 1960, Hirsch Weir mentions that she is planning a trip to Europe and has been invited to Germany for a lecture on “applied linguistics”. The MIT Libraries Archive ([Jakobson Papers, Collection ML 12, box 41, folder 3](#)).
7. For a critical reading of these archives, see Kaplan and Lemov (2019).
8. http://www.ilkk.org/~ppk/Manuals/Ampex_Misc/Ampex-960_brochure.pdf.
9. http://www.preservationssound.com/wp-content/uploads/2015/03/Magnecord_1950_part_4.pdf; http://www.preservationssound.com/wp-content/uploads/2015/03/Magnecord_1950_part_5.pdf.
10. The reconstruction took place at the Max Planck Institute for the History of Science, Berlin. I thank Hartmut Kern and Fabian Voigtschild for their help in the technical research and the recordings, and William Bouk for agreeing to participate.
11. Jakobson had likewise worked on child language in his early career. See [Jakobson \(\[1941\] 1968\)](#).
12. See Ziegler (2006, 21) and “Dokumentation” in the accompanying CD-ROM, 15. Unfortunately, Abraham did not publish on the topic. Some of the experimental cylinders at the Phonogramm-Archiv are not yet digitised, so Abraham’s recording of his son may still be found among them.
13. Charcot’s lectures on aphasia are summarised in Bernard (1885).
14. An experiment of this kind is shown in the collection Bourneville and Regnard (1879–80, 3:18). See Richer (1890). The term “observation provoquée ou active” was coined by Claude Bernard (Bernard [1865] 1927, 7, 19–21).
15. Ballet quotes Rivarol approvingly in *Langage intérieur* (1888, 17).
16. On Freud’s use of his own voice in the talking cure, see Latham (2013, 112).
17. On Freud’s interest in the vocal articulation of psychic illness, see Lecourt (2000).
18. In the preface to his “New Introductory Lectures on Psycho-Analysis”, Freud describes himself as being gifted with a “phonographic memory” (1933, 22, 5).
19. The strongest objections to Freud’s method concerned the treatment of neuroses, and it was in this field that the American Earl F. Zinn introduced sound recording into his psychiatric practice. Zinn’s Edison Dictaphone recordings of a patient suffering from schizophrenia, conducted between 1933 and 1935, are the best known of such activities. See Zinn (n.d.)
20. See the diagram in Lacan (2014, 4).

21. Lacan introduced his notion of “full speech” in opposition to Freud’s idea of psychoanalysis as a technique of deciphering the patient’s language-based free associations and seemingly meaningful discourse. For Lacan, the subject reveals itself not through language but only through full speech, which evokes the listener instead of informing him or her (Lacan 1977). Derrida criticised Lacan for mistaking the “presence of the word” for the truth (Derrida 1975, 86).
22. <http://www.valas.fr/Audiophones-de-Jacques-Lacan-2,187>. At the same time, Lacan had shorthand typists take down his seminar; their transcripts were used as the basis for the edition of his writings. See Schmitz (2001, 244–246); Roudinesco (1997).
23. I would like to thank Jamie Cohen-Cole for pointing me towards Nelson’s project.
24. The data were kept anonymous, but Emily Oster, today an economist at Brown University, revealed her identity in a “New Foreword” to the new edition of *Narratives in the Crib* (Harvard University Press, 2006).
25. <https://childes.talkbank.org/access/Eng-NA/Nelson.html>.

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Notes on contributor

Viktoria Tkaczyk is a professor at the department of musicology and media studies, Humboldt-Universität zu Berlin. Currently, she is working on a project entitled *Thinking with Sound. New Agendas in the Sciences and Humanities around 1900*. Her articles have appeared in journals including *Annals of Science, Technology and Culture*, *History of Humanities*, *Grey Room*, *The Public Historian*, *Cabinet*, and *Artefact*.

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