Chapter 1 : Completed PhD Theses : Faculty of Education

PRIVATE SPEECH, EXECUTIVE FUNCTIONING, AND THE DEVELOPMENT OF VERBAL SELF-REGULATION Edited by Adam Winsler George Mason University Charles Fernyhough.

Public language, I argue, is a cognition-enhancing tool -- it is a species of external artifact whose current adaptive value is partially constituted by its role in re-shaping the kinds of computational space that our biological brains must negotiate in order to solve certain types of problems, or to carry out certain complex projects. This computational role of language has been somewhat neglected not un-noticed, but not rigorously pursued either in recent cognitive science, due perhaps to a quite proper fascination with and concentration upon, that other obvious dimension: In this chapter, I try to display the broad shape of the alternative orientation. I discuss the views of some recent and not-so-recent authors, who recognize in various ways, the potential role of language and text in transforming, reshaping and simplifying the computational tasks that confront the biological brain. I then pursue this idea through a series of examples involving planning, concept learning, the construction of complex thoughts and the capacity to refelect on our own cognitive profiles. Neither are sextants, compasses, maps, slide rules and all the other paraphenelia which have accreted around the basic biological brains of homo sapiens. In the case of these other tools and props, however, it is transparently clear that they function so as to either carry out or to facilitate computational operations important to various human projects. The slide rule transforms complex mathematical problems ones that would baffle or tax the unaided subject into simple tasks of perceptual recognition. The map provides geographical information in a format well-suited to aid complex planning and strategic military operations. The compass gathers and displays a kind of information that most unaided human subjects do not seem to command. These various tools and props thus act to generate information, or to store it, or to transform it, or some combination of the three. In so doing, they impact our individual and collective problem-solving capacities in much the same dramatic ways as various software packages impact the performance of a simple pc. Public language, I shall argue, is just such a tool -- it is a species of external artifact whose current adaptive value is partially constituted by its role in re-shaping the kinds of computational space that our biological brains must negotiate in order to solve certain types of problems, or to carry out certain complex projects. Work on sentence parsing, language use and story understanding has thus concentrated on the role of language in processes of information transfer between agents and on information retrieval from texts. But it has had little to say about the computational role of the linguistic formulations themselves, or about the special properties of the external media that support linguistic encodings. In this chapter, I hope to display the broad shape of such an alternative interest. I begin by discussing the views of some recent and not-so-recent authors, who recognize in various ways, the potential role of language and text in transforming, reshaping and simplifying the computational tasks that confront the biological brain. Sections 2 and 3 pursue this broad vision across a variety of cases involving planning, coordination, learning and the construction of complex thoughts and arguments. The fourth section extends these last considerations to encompass the rather special class of meta-cognitive operations and tries to implicate language as a n essential part of the process of thinking about our own thoughts and cognitive profiles. The final section suggests some broader implications and raises some questions concerning the boundary between the intelligent agent and the world. Supra-Communicative Views of Language. The idea that language may do far more than merely serve as a vehicle for communication is not new. It is clearly present in the work of developmentalists such as Vygotsky , and more recently that of Laura Berk and others see e. It figures in the philosophical conjectures and arguments of e. Peter Carruthers to appear and Ray Jackendoff to appear. And it surfaces in the more cognitive science oriented speculations of Daniel Dennett It will be helpful to begin by rehearsing some of the central ideas in this literature, before pursuing our own version viz. He posited powerful links between speech, social experience and learning. Two especially pertinent Vygotskian ideas, for present purposes, concern the role of

private speech, and of scaffolded action action within the so-called zone of proximal development -- see Vygotsky trans. Such support could come from the use of tools, or the knowledge and skills of others; that is to say, scaffolding as I shall use the term denotes a broad class of physical, cognitive and social augmentations -- augmentations which allow us to achieve some goal which would otherwise be beyond us. Later on, when the adult is absent, the child can conduct a similar dialogue, but this time with herself. In such cases, the role of language is to guide and shape our own behavior -- it is a tool for structuring and controlling action and not merely a medium of information transfer between agents. This Vygotskian image is supported by more recent bodies of developmental research, such as that carried out by Laura Berk and Ruth Garvin. Berk and Garvin observed and recorded the ongoing speech of a group of year olds in Kentucky. They found that the incidence of such speech increased when the child was alone and engaged in trying to perform some difficult task. In subsequent studies Bivens and Berk , Berk it was found that the children who made the most self-directed comments were the ones who subsequently mastered the tasks best. The theme of language as a tool has also been developed by the philosopher Christopher Gauker. To get the flavor, consider the use of a symbol, by a chimpanzee, to request a banana. The chimp touches a specific key on a key-pad the precise physical location of the key can be varied between trials and learns that making that symbol light tends to promote the arrival of bananas. Gauker looks at a variety of symbol-using behaviors and concludes that they all succumb to this kind of analysis. Gauker tends to see the role of language as, if you like, directly causal: However, the idea that we learn, by experience, of the peculiar causal potencies of specific signs and symbols is in principle much broader. We might even, as in the Vygotskian examples and as argued in Dennett , discover that the self-directed utterance of words and phrases has certain effects on our own behavior! We might also learn to exploit language as a tool in a variety of even less direct ways, as a means of altering the shape of computational problem spaces see Section 2 following. One obvious question which the putative role of language as a self-directed tool raises is "how does it work? What is it about, for example, self-directed speech which fits it to play a guiding role? Surely, all that public language can ever be is a medium for expressing ideas which are already formulated and understood in some other, more basic, inner code? It is precisely this view which a supra-communicative account of language has ultimately to reject. One way to do so is to depict public language as itself the medium of a special kind of thought. Another not altogether distinct way is to depict linguaform inputs as having distinctive effects on some inner computational device. Thus Carruthers argues that, in this case at least, we should take very seriously the evidence of our own introspection. It certainly often seems as if our very thoughts are composed of the words and sentences of public language. And the reason we have this impression, Carruthers argues, is because it is true: By extension, Carruthers is able to view many intra-personal uses of language as less a matter of simple communication than of what he nicely terms public thinking. This perspective fits satisfyingly with the Vygotskian view championed by Berk, and is also applicable to the interesting case of writing down our ideas. Here Carruthers suggests "one does not first entertain a private thought and then write it down: I shall return to this point later see section 2 , since I believe that what Carruthers says is almost right, but that we can better understand the kind of case he has in mind by treating the writing as an environmental manipulation which transforms the problem space for human brains. The reference here is to the idea, promoted by Benjamin Whorf , that human minds are profoundly shaped and altered by the particular public languages we come to speak. An alternative way to unpack a supra-communicative view of language, we noted, is to suppose that the linguistic inputs actually re-program or otherwise alter the high-level computational structure of the brain itself. The exegesis is delicate and therefore tentative , but something akin to this view seems to be held by Daniel Dennett when he suggests that "conscious human minds are more-or-less serial virtual machines implemented-inefficiently-on the parallel hardware that evolution has provided for us" Dennett, , p. In this and other passages, the idea seems to be that the bombardment of something like parallel processing, connectionist, pattern-completing brains by amongst other things public language texts and sentences reminders, plans, exhortations, questions, etc. In such cases, the installation of a new program allows the user to treat e. What Dennett is proposing is, he tells us op.

Strikingly, Dennett suggests that it is this subtle re-programming of the brain by primarily linguistic bombardment which yields the phenomena of human consciousness our sense of self and enables us to far surpass the behavioral and cognitive achievements of most other animals see e. Dennett thus depicts our advanced cognitive skills as in large part a result not of our innate hardware which may differ only in small, though important, ways from that of other animals but of the special way that various plastic programmable features of the brain are modified by the effects of culture and language. As Dennett puts it, the serial machine is installed courtesy of "myriad microsettings in the plasticity of the brain" Dennett p. Of course, mere exposure to culture and language is not sufficient to ensure human-like cognition. You can expose a cockroach to all the language you like and get no trace of the cognitive transformations which Dennett sees in us. Rather it is that some relatively small hardware differences e. The view I want to develop is clearly deeply related, but differs I think in one crucial respect. Where Dennett sees public language as effecting a profound but subtle re-organization of the brain itself, I am inclined to see it as in essence heart an external resource which complements -- but does not profoundly alter -- the brains own basic modes of representation and computation. That is to say, I see the changes as relatively superficial ones, geared to allowing us to use and exploit various external resource to the full. The positions are not, of course, wholly distinct. In any case, the mere fact that we often mentally rehearse sentences in our head and use them to guide and alter our behavior means that one cannot and should not treat language and culture as wholly external resources. Nonetheless, it remains possible that such rehearsal neither requires nor results in the installation of any fundamentally different kind of computational device in the brain, but rather involves the use of the same old essentially pattern-completing resources to model the special kinds of behavior observed in the public linguistic world. And as Paul Churchland , p. This view of inner rehearsal is nicely developed by the connectionists Rumelhart, Smolensky, McClelland, and Hinton who argue that the general strategy of "mentally modeling" the behavior of selected aspects of our environment is especially important insofar as it allows us to imagine external resources with which we have previously physically interacted, and to replay the dynamics of such interactions in our heads. Thus experience with drawing and using Venn diagrams allows us to train a neural network which subsequently allows us to manipulate imagined Venn diagrams in our heads. Such imaginative manipulations require a specially trained neural resource to be sure. But there is no reason to suppose that such training results in the installation of a different kind of computational device. It is the same old process of pattern completion in high dimensional representational spaces, but applied to the special domain of a specific kind of external representation, The link to a Vygotskian image is clear and remarked upon by the authors who the summarize their view saying: We can be instructed to behave in a particular way. Responding to instructions in this way can be viewed simply as responding to some environmental event. We can also remember such an instruction and "tell ourselves" what to do. We have, in this way, internalized the instruction. We believe that the process of following instructions is essentially the same whether we have told ourselves or have been told what to do. Thus even here we have a kind of internalization of an external representational format. Rumelhart, Smolensky, McClelland, and Hinton p. The authors note that such external formalisms are especially hard to invent and slow to develop, and are themselves the kinds of product which in an innocently bootstrapping kind of way can evolve only thanks to the linguistically-mediated processes of cultural storage and gradual refinement over many lifetimes. The Rumelhart et al vision thus depicts language as a key element in a variety of environmentally extended computational processes. This notion of computational processes inhering in larger systems ones that may incorporate the activities of many individual biological brains is further developed and defended in Hutchins Hutchins offers a beautiful and detailed treatment that highlights the ways representation may flow and be transformed within larger, socially and technologically extended systems. The environmental operations thus complement the activities of the biological brains. The tack I am about to pursue likewise depicts language as an external artifact designed to complement, rather than recapitulate or transfigure, the basic processing profile we share with other animals. Whether it depicts inner linguistic rehearsal as literally constitutive of specific human cognizings as Carruthers

claims is moot. Certainly, inner rehearsals, when they occur, are quite literally models of linguistic productions. But what is most important, I believe, is not to try to answer the question, "do we actually think in words" to which the answer is "in a way yes, in a way no"! Here, then, are six broad ways in which linguistic artifacts can complement the activity of the pattern-completing brain. This is, of course, the most obvious and oft-remarked case.

Results demonstrated children's substantial production of private and inner speech in this communicative situation, with speech forms varying in amount and type as a function of age, communicative.

Overview, Theoretical, and Biological Foundations: Still talking to ourselves after all these years: Dialogic thinking Charles Fernyhough; 3. The neuropsychology of covert and overt speech: Language, Communication, Social Cognition and Awareness: Private speech and theory of mind: Development of communicative competence through private and inner speech Peter Feigenbaum; 8. Symbols and Tools Throughout the Lifespan: Private pointing and private speech: Symbols as tools in the development of executive function Stephanie Carlson and Danielle M. On the persistence of private speech: Duncan and Donato Tartulli; Private speech beyond childhood: Motivational and Educational Applications: Private speech and motivation: Atencio and Ignacio Montero; Creativity and private speech in young children C. Stephen White and Martha Daugherty; This edited volume by Adam Winsler, Charles Fernyhough, and Ignacio Montero brings together chapters by researchers who have examined different aspects of the connection between private speech and cognition, extending considerably the range of topics that behavioral scientists examined when I was in graduate school. The early chapters provide updated theoretical foundations for making sense of the chapters that follow, which provide a thorough review of what researchers know and believe about the developmental relation between language and thought. This will be an essential book for anyone interested in this important topic of cognitive developmental research. Bjorklund, Florida Atlantic University "This is a wide-ranging collection of very stimulating, and at times, provocative, chapters on one of the central concepts of cultural-historical theory. A welcome feature of the volume is the inclusion of research on adult private speech. At the same time, recognition of the growing body of research in applied linguistics on private speech in second language learners is especially satisfying. Lantolf, The Pennsylvania State University "Previously marooned in something of a scholarly backwater, the study of private speech has now well and truly entered the mainstream with the publication of this expansive and integrative volume. Together the chapters convincingly demonstrate how the study of private speech is fundamental to our understanding not only of the relation between language and thought, but also of the organization of behavior during typical and atypical development. It is essential reading for all who are concerned with how language comes to regulate action through development. The authors rely upon the seminal focus of Lev Vygotsky on the internalization of speech and combine it with our contemporary discourse about executive functions in human cognitive processes. By covering all the important fields of research currently present in the investigation of private speech - from neuroscience to creativity - the volume charts out new horizons for explaining how the internalized speaking operates within the developing mind over the whole of the human life course. The international cast of authors sets up a creative framework for new perspectives that should innovate the field towards a new focus of study on intra-psychological semiotic processes, and would transcend the currently fashionable large-samples based statistically flavored research practices in the direction of a new look at the legacies of Wilhelm von Humboldt, Gustav Shpet, and Charles Sanders Peirce. Vygotsky and Early Childhood Education He has been involved in three major longitudinal developmental studies with samples in Cambridge, Stoke-on-Trent, and Stockton-upon-Tees, along with several studies of psychosis-like symptoms in healthy adults and children. Recent articles have included work on the neuropsychology of voice-hearing, the stress-diathesis model of schizophrenia, and a Vygotskian approach to the phenomenon of auditory verbal hallucinations. His introductory book on developmental psychology, A Thousand Days of Wonder: He has studied motivation in education from a socio-cultural perspective, and his work has extended the mediational role of private speech to emotional processes. Also, he engages in considerable editorial activities for Spanish-language journals in psychology and education Anuario de Psicologia, Estudios de Psicologia, Revista de Psicologia, International Journal of Clinical and Health Psychology.

The Modern Language Journal, 78, p. A Vygotskian Perspective on Dialogic Communication". Vygotskian Approaches to Second Language Research. Ablex Publishing Corporation, , p. A cognitive tool in verbal communication. International University of Japan, a. Speaking as cognitive regulation: A study of L1 and L2 dyadic problem-solving activity. A Study of L1 and L2 recall tasks. An Overview of theory and the status of research. From social interaction to self-regulation. Lawrence Erlbaum, , p. Scientific American, , p. Developmental Psychology, 22, p. Studies in Second Language Acquisition, 15, , p. International Journal of Applied Linguistics, vol. Private Speech in the Second Language Classroom: From Social Interaction to Self-Regulation. Lawrence Erlbaum Associates, , p. Lawrence Erlbaum Associates, The Canadian Modern Language Review 53 4 , p. The Modern Language Journal 78 4 , p. Critical Inquiry, , 10 2 , p. Bulletin de Psychologie, 19, p. Applied Linguistics, 6, no. A commentary on Frauerglass and Diaz. First Conference for Socio-Cultural Research: On the notion of internalization. The Spanish Journal of Psychology, , Vol. Anuario de Psicologia, , p. Acesso em 28 set. International Journal of Behavioral Development, Acesso em 23 jan. Acesso em 08 mar. The road to competence in an alien land: Culture, Communication and Cognition. Cambridge University Press, , p. An interactionist model of language development. The sociogenesis of language and human conduct. Child Development, 39 p. Sociocultural Theory and Second Language Learning. Oxford University Press, Intrapersonal communication and second language learning. Annual Review of Applied Linguistics, 15, , Ablex Publishing Corporation, Acesso em 07 mar. A review of studies". Applied Linguistics, , vol. Learning Strategies in Second language Acquisition. Cambridge University Press, A Comparison of Native and L2 Discourse. Focus on the Classroom. Estudos socioculturais da mente. Acesso em 16 jan. Anuario de Psicologia, , vol. Acesso em 11 jan. Inner Speech and Thought. The development of self-regulation through private speech. John Wiley e Sons, , p. International Journal of Behavioral Development, 18, p. Private Speech Coding Manual. Journal of Child Language, 27, p. O strukture slovesnoj pamjati i ee roli v usvoenii jazyka The strucutre of Word memory and irs role in second language acquisition. Psikhologicheskij Zjhurnal Journal of Psychology , 4, ,

Chapter 4 : SAGE Reference - Encyclopedia of Language Development

Review of The Neo-Vygotskian Approach to Child Development. Cite this publication. Peter Feigenbaum. ; of communicative competence through private and inner speech.

Published online May This work was supported by the Wellcome Trust WT Copyright for this article is retained by the author s. Author s grant s the American Psychological Association the exclusive right to publish the article and identify itself as the original publisher. This article has been cited by other articles in PMC. Abstract Inner speechâ€"also known as covert speech or verbal thinkingâ€"has been implicated in theories of cognitive development, speech monitoring, executive function, and psychopathology. Despite a growing body of knowledge on its phenomenology, development, and function, approaches to the scientific study of inner speech have remained diffuse and largely unintegrated. This review examines prominent theoretical approaches to inner speech and methodological challenges in its study, before reviewing current evidence on inner speech in children and adults from both typical and atypical populations. We conclude by considering prospects for an integrated cognitive science of inner speech, and present a multicomponent model of the phenomenon informed by developmental, cognitive, and psycholinguistic considerations. Despite its variability among individuals and across the life span, inner speech appears to perform significant functions in human cognition, which in some cases reflect its developmental origins and its sharing of resources with other cognitive processes. Despite its apparent importance for human cognition, inner speech has received relatively little attention from psychologists and cognitive neuroscientists, partly due to methodological problems involved in its study. The aim of the present article is to review the existing empirical work on inner speech and provide a theoretical integration of well-established and more recent research findings. First, we summarize the key theoretical positions that have been advanced relating to the development, cognitive functions, and phenomenology of inner speech. We then consider methodological issues that attend the study of inner speech. Next, we consider how inner speech emerges in childhood. In the fourth section, we consider the phenomenology of inner speech in adulthood along with its cognitive functions. We then review what is known about inner speech in atypical populations before considering neuropsychological evidence relevant to theorizing about its functional significance. Finally, we consider prospects for an integrated cognitive science of inner speech, combining developmental, cognitive, psycholinguistic, and neuropsychological evidence to provide a multicomponent model of the phenomenon. Inner speech can be defined as the subjective experience of language in the absence of overt and audible articulation. This definition is necessarily simplistic: Inner speech, on these terms, incorporates but does not reduce to phenomena such as subvocal rehearsal the use of phonological codes for the maintenance of information in working memory. The concept is also sometimes used interchangeably with thinking, to the extent that a close focus on the phenomenological, developmental, and cognitive features of inner speech necessitates a certain amount of redefinition of that term. In what follows, we will avoid talking about thinking in favour of mental processes that can be more tightly specified. Given this diversity in terminology, our literature search covered a broad range of research areas and depended considerably on secondary sources and citation lists of key articles. Both empirical and theoretical articles were permitted. Studies that only covered externalized forms of self-talk were generally not included, unless they referred to a relevant effect or population where inner speech data were not available; for instance, to our knowledge there have been no studies specifically studying inner speech in attention deficit hyperactivity disorder ADHD , but there is research on private speech e. Where a recent review on a topic had been published such as Hubbard, , on auditory imagery; or Winsler et al. And yet inner speech has long had an important role to play in psychological theorizing. Plato undated noted that a dialogic conversation with the self is a familiar aspect of human experience. Although inner speech figures in a variety of psychological, neuroscientific, and philosophical discourses Fernyhough, , its nature, development, phenomenology, and functional significance have received little theoretical or empirical attention. One reason for this is that inner

speech by definition cannot be directly observed, limiting the scope for its empirical study and requiring the development of methodologies for studying it indirectly see Methodological Issues. While there exists a range of theoretical perspectives on inner speech e. One relates to the development of verbal mediation of cognition and behavior, and one relates to rehearsal and working memory. Vygotsky assumed that understanding how such a phenomenon emerges over the life span is necessary for full comprehension of its subjective qualities and functional characteristics. The development of verbal mediation is envisaged as the process through which children become able to use language and other sign systems to regulate their own behavior. Vygotsky formulated his view of inner speech in contrast to the theory of John B. This view of inner speech as subvocalized language was, Vygotsky believed, mistaken Berk, Rather, he contended, inner speech is profoundly transformed in the process of internalization, and its development involves processes more complex than the mere attenuation of the behavioral components of speaking. Vygotsky saw support for his theory in the phenomenon now known as private speech previously egocentric speech , in which children talk to themselves while engaged in a cognitive task. Vygotsky saw private speech as having a primary role in the self-regulation of cognition and behavior, with the child gradually taking on greater strategic responsibility for activities that previously required the input of an expert other such as a caregiver. It is also now acknowledged that private speech does not atrophy after the completion of internalization, but can persist into adulthood as a valuable self-regulatory and motivational tool. Vygotsky identified three main semantic transformations accompanying internalization: Fernyhough proposed that inner speech should take two distinct forms: In this latter form of inner speech, the phonological qualities of the internalized speech are attenuated and the multiple perspectives Fernyhough, , a that constitute the dialogue are manifested simultaneously. Inner speech has also been proposed to have an important role in metacognition, self-awareness, and self-understanding Morin, Inner Speech in Working Memory A second important theoretical perspective concerns the role of inner speech in working memory. Baddeley and Hitch proposed that working memory comprised three components: Baddeley also added a fourth component, the episodic buffer, a multimodal temporary store that can bind concurrent stimuli and draw on information from long-term memory. In this model, the phonological loop is made up of two subcomponents: Support for the independence of a phonological loop from other working memory processes has largely come from evidence of interference effects in dual-task studies. In such paradigms, participants are asked to encode a set of target stimuliâ€"such as learning a list of wordsâ€"while engaging in a secondary task which either involves verbal or visuospatial processing. A typical verbal distractor method is articulatory suppression: Evidence of verbal representations in the memory trace comes from common memory effects related to specific verbal and phonological properties. Words that sound the same are also prone to confusion, leading to poorer recall for the whole list of items: The ability to hold phonological representations in mind, however, appears to come online much earlier, possibly as young as 18 months e. Comparing Vygotskian and Working Memory Approaches to Inner Speech To date, there have been few attempts to integrate the Vygotskian and working memory approaches to inner speech although see Al-Namlah et al. The presence of a phonological loop indeed rules out the suggestion that an earlier stage of private speech is necessary for the development of verbal mentation. However, as Al-Namlah, Fernyhough, and Meins point out, this objection misunderstands the Vygotskian position, which prioritizes the question of how language is employed in internal self-regulation above the neural or cognitive substrates that make language use possible. Put another way, the working memory approach largely confines itself to questions of what inner speech is necessary for i. Methodological Issues As a psychological process with no overt behavioral manifestation, inner speech has traditionally been considered difficult or impossible to study empirically. However, recent methodological advances have meant that a range of direct and indirect methods exist for studying inner speech. Some methods have been designed to encourage inner speech and examine its effects; some have sought to block or inhibit inner speech and observe which other processes are also impacted. Questionnaires The simplest approach to investigating inner speech is to ask people to report directly on its occurrence. Such methods are particularly valuable for investigating inner speech frequency,

context dependence, and phenomenological properties, although their veridicality has often been questioned for a recent example see Hurlburt et al. Questionnaire approaches to inner speech tend to follow typical steps for scale development. For example, McCarthy-Jones and Fernyhough generated statements about the quality and structure of inner speech and submitted them to exploratory and confirmatory factor analysis in two undergraduate samples, resulting in an item Varieties of Inner Speech Questionnaire VISQ. Other self-report scales assess features such as inner speech frequency, content, and context e. The virtue of such approaches is that they avoid the need for participants to make a general judgment about the extent and nature of their inner speech, usually asking only about the contents of experience at the moment of a random alert such as a beep. Some experience sampling techniques will use the same or similar items as questionnaires that ask about inner speech; others have used diary or thought-listing techniques to prompt participants to report on their experience in a more open-ended way e. Other researchers prefer to use detailed introspective interviews as part of their experience sampling approach. One highly developed method, Descriptive Experience Sampling DES , involves training participants to report on their own inner experience in the moment before a random alert, first through making brief notes for themselves and then through a detailed expositional interview. As will be discussed, using DES to assess inner speech reveals striking phenomenological richness and diversity, which in some cases appears to contradict findings from self-report questionnaires Hurlburt et al. Private Speech as an Indicator of Inner Speech One indirect approach to researching inner speech is through the study of what Vygotsky held to be its observable counterpart, private speech. For example, Al-Namlah et al. Such a finding suggests close links between private speech and covert verbal encoding. There are difficulties, however, with taking private speech as a direct proxy for inner speech: Subtle signs of inner speech can also be coded alongside private speech. For example, Fernyhough and Fradley used a coding frame based on Berk, that distinguished between social speech vocalizations during a task that were clearly addressed to someone , private speech nonaddressed overt vocalizations , and task-relevant external manifestations of inner speech indecipherable lip and tongue movements or silent articulatory behavior during a task. Dual-Task Methods Another indirect methodology that escapes some of these concerns is the use of dual-task designs. The rationale here is that interfering with or blocking inner speech, through a secondary task that prevents subvocal articulation, can be investigated in relation to deficits on a primary task similarly to how such methods are used in working memory studies. Articulatory suppression to interfere with inner speech on cognitive tasks has been widely used in children and adults Baldo et al. Ideally articulatory suppression is deployed along with an additional condition including a nonverbal task, such as spatial tapping, as this allows investigators to control for general effects of dual-tasking and to identify effects specific to inner speech processes. In working memory studies, a further control task is sometimes included to interfere with the central executive: Phonological Judgments An alternative method of studying inner speech, which overlaps with methods used in auditory imagery research, is to ask participants to make judgments based on the contents of their inner speech. Such methods have been argued to provide a more objective test of inner speech use than self-report methods Hubbard, However, it should be noted that judgment tasks of this kind often assume that phonological properties of inner speech are in some way being consulted, rather than the decision being based on other available stimulus information rhyming judgments, for instance, could also be based on orthographic features of word stimuli. Neuroimaging and Neuropsychology Finally, a number of studies have either used functional neuroimaging techniques or neuropsychological case studies to examine the neural substrates of inner speech. Such studies have been conducted since the earliest days of neuroimaging McGuire et al. Typical inner speech elicitation methods include subvocal articulation of words and sentences or imagining speech with varying characteristics e. Approaches for counteracting this include the administration of behavioral tasks that require internal phonological judgments: Neuroimaging findings relating to inner speech are considered in Inner Speech in the Brain. Development of Inner Speech Studying the development of inner speech can give us important information about its phenomenological qualities and psychological functions. Private Speech as a Precursor of Inner Speech The methodological challenges that attend the study of inner

speech have led to a focus on its observable developmental precursor, private speech, as a window onto its development. Key questions that have been examined include the emergence and apparent extinction of private speech, the social context within which self-directed speech is observed, and the role of verbal mediation in supporting specific activities. Much of the prior literature on private speech was outlined in an extensive review by Winsler ; accordingly, this section provides a brief overview of private speech findings in children, with reference to some more recent studies. Private speech has subsequently been shown to have a significant functional role in the self-regulation of cognition and behavior. Typically emerging with the development of expressive language skills around age 2â€"3, private speech frequently takes the form of an accompaniment to or commentary on an ongoing activity. A regular occurrence between the ages of 3 and 8, private speech appears to follow a trajectory from overt task-irrelevant speech, to overt task-relevant speech e. Examples of continued use of private speech, however, do not necessarily indicate similar functions or benefits for performance:

Chapter 5 : Goffman versus Vygotsky on 'egocentric' ('private') speech | Peter E Jones - blog.quintoapp.co

[et al.] --Private speech and theory of mind: evidence for developing interfunctional relations / Charles Fernyhough and Elizabeth Meins --Development of communicative competence through private and inner speech / Peter Feigenbaum --Private speech in the framework of referential communication / Conchi San Martín Martinez, Humbert Boada i.

Kathrin Zimmermann, Peter Brugger Talking to oneself can be silent inner speech or vocalized for others to hear private speech, or soliloquy. We investigated these two types of self-communication in 28 deaf signers and 28 hearing adults. With a questionnaire specifically developed for this study, we established the visible analog of vocalized private speech in deaf signers. Deaf signers were also found to engage in inner speech, which appeared to have a mostly affirmative character Journal of Deaf Studies and Deaf Education https: It is unclear, however, exactly when this gap begins to emerge and in what areas. Both standardized and nonstandardized measures were used to assess understanding in number, geometry, measurement, problem solving, and patterns, reasoning and algebra. Teachers explicitly taught five preschoolers the phonological awareness skills of syllable segmentation, initial phoneme isolation, and rhyme discrimination in the context of a multifaceted emergent literacy intervention. Instruction occurred in settings where teachers used simultaneous communication or spoken language only Jihong Wang, Jemina Napier This study investigated the effects of hearing status and age of signed language acquisition on signed language working memory capacity. The results revealed that the hearing signers i. Nine children who received CIs before 30 months of age participated in this study at three, four, and five years postimplantation. Nine typical 3-, 4-, and 5-year-olds served as control groups. All children participated in a story-retell task. Percent correct of tense marking in the task was computed. Within the groups, percent correct of tense marking changed significantly in children with CIs and in typical children who had more hearing experience Christopher M Stanzione, Susan M Perez, Amy R Lederberg To address the paucity of current research on the development of creativity in deaf students, and to extend existing research to adolescents, the present study investigated divergent thinking, a method of assessing creativity, in both deaf and hearing adolescents. We assessed divergent thinking in two domains, figural and verbal, while also adjusting the instructional method in written format, sign language, or spoken English. We examined indices for emotion understanding and their associations with communication skills in children aged 2. On all emotion-understanding tasks, children with a cochlear implant were less proficient than children with normal hearing This study examines the use of these verbal predicate structures and their gestural counterparts, both separately and simultaneously, in narratives by deaf children with various levels of exposure to BSL ages 5;1 to 7;5 and deaf adult native BSL signers. Results reveal that all groups used the same types of predicative structures, including children with minimal BSL exposure Beverly J Trezek, Gregory R Hancock The purpose of the present study was to examine the results of implementing remedial instruction in the alphabetic principle with deaf and hard-of-hearing DHH students educated in a sign bilingual setting. Data were analyzed in 2 phases, with the first using paired-sample t tests and Pearson correlations and the second phase employing structural equation modeling. Hearing parents and mental health clinicians unfamiliar with typical behaviors of deaf children may have difficulties differentiating the clinical presentation of symptoms of TD from the effects of deafness, as well as in implementing appropriate interventions. This case study reports the history, symptoms, diagnostic process, and treatment interventions. This is relevant for furthering the clinical knowledge of mental health professionals working with Deaf, deaf, and hard-of-hearing children and adolescents John L Luckner, Catherine Ayantoye Increasing numbers of students who are deaf or hard of hearing are receiving their education in general education settings with special education support from an itinerant teacher. However, previous research indicates that the majority of teacher preparation programs do not provide training on the itinerant teaching model or set up field experiences for preservice teachers as an itinerant teacher. The purpose of this study was to survey a national sample of itinerant teachers of students who are deaf or hard of hearing to learn about their practices,

preparation, perceptions, and the students they serve Different aspects of parental support predicted different types of career self-efficacies across the 3 groups This was complemented by a questionnaire that measured communicative competence and behavioral problems German version of the Strengths and Difficulties Questionnaire; SDQ-D The process included forward translation, meeting with a team of translators, producing a second draft of the BSL version and back translating into English. Details of the translation process are addressed, including a the implications of translating between modalities written text to visual language ; b clarity of frequency anchors: Analysis of data from both samples supported a item questionnaire, with all items loading onto a single composite factor This study examined the relationship between quality of life and educational placement that include and do not include other DHH youth. Participants included DHH youth, ages with bilateral hearing loss. Results showed that there were few differences in quality of life related to school placement with age, gender, depression symptoms, and hearing level as covariates Linda J Spencer, Ling-Yu Guo This study provided a yearly record of consonant development for the initial 4 years of cochlear implant CI use and established a precedent for using a standardized articulation test, the Goldman-Fristoe Test of Articulation-2 Goldman, R. Goldman-Fristoe Test of Articulation The study used CI age as a referent for 32 children who received their CI before 30 months of age.

Chapter 6 : - NLM Catalog Result

'Vygotsky viewed private speech as the link between early socially communicative speech and mature inner speech. Social speech is vocalized speech addressed and intellectually adapted to others, and inner speech is subvocalized speech directed and adapted to oneself, whereas private speech is vocalized speech addressed and adapted to oneself.

In this study, we examine the development of referential communicative regulation, incorporating the Received 21 September Vygotskian notion of private speech. From this perspective, private speech may serve a regulatory role Received in revised form when the child speaker is focused on what to say when speaking to others. In a longitudinal study carried 30 September out with 10 pairs of children with a mean age of 4. This was not the case at the ages 4. In this process, the capacity to improve message accuracy by coordinating private speech with peer questioning clearly emerges with age. Introduction representations of some object, event, phenomenon, or idea that constitutes the referent of the message. Most of the prior inves- The capacity for regulating the elements required for success- tigations use variants of the procedure created by Glucksberg and ful communication represents a key turning point in the mastery Krauss In these tasks, the speaker should select and verbally of communicative processes Flavell, ; Lefebvre-Pinard, ; code a given referent within a message. When the speaker distinguishes in the with many indicators. In this study, we examine this issue within message one of these referents unequivocally, the listener has made the framework of referential communication Dickson, The the correct choice. For this author, the goal of the communicative involves the detection of possible ambiguities in the information encounter is the verbal transmission to an interlocutor of the provided or received and the deployment of adequate resolu- tion strategies. The latter authors designed a spatial referential task in the four studies, the way in which the messages were consid- in which, in order to communicate the location of some objects ered as being private speech varied across studies. Varenne and referents , spatial support relations—on top, beneath—and proxim- Beaudichon based the identification of private speech exclu- ity relations—near, behind, to the left—had to be identified. This task sively on the presence of self-corrections within the messages. In the case of observed. At this age, children are able that were not explicitly directed at another person and that indi- to identify referents by name and some of their attributes. They cated a self-regulatory effort to elaborate the message. Although are able to provide support relationships but they usually fail to they used different codification systems, each of the studies showed indicate proximity relationships. In addition, the developmental course of this presence was very Despite the low quality of these messages, the listeners do not usu- similar to that usually identified for other types of tasks; that is ally formulate any clarification questions. Between 6 and 8 years, private speech begins to appear at the age of 4 and shows a peak the messages formulated are of better quality, as proximity rela- around the age of 6. Boada and Forns carried out a longitudi- tions are provided, and the listeners usually ask questions aimed at nal study that documented an increase of private speech between clarifying this kind of relation. The above-mentioned works show that, despite commu- ences between the use of private speech between the ages of 8 and nicative progress, ambiguous or low-quality messages do not 9. Question formu- of private speech external manifestations of inner speech. This does not imply that the speaker or the listener did not between the 4. Between the ages of 6. Finally, regarding evidence of the relationship between private Recently, a number of studies have reintroduced the Vygotskian speech and the difficulty of the communicative task, there are some notion of private speech for in-depth understanding of the develop- specific data from the mentioned studies that can be addressed. Private speech amount of information needed for the identification and location of is considered to be verbal production that seems to be directed the objects. The difficult referents were those that required greater toward oneself, and is used to regulate the current task, and pro- use of proximity relations right, left in order to locate them cor- gressively allows access to planning and autonomous regulation rectly. The results show a higher amount of private speech use in of the activity Diaz, Several decades of discourse may serve a regulatory role in referential tasks. The studies that show that private speech

is in allowing communicators to reflect on the quality and efficiency involved in the regulation of referential communication are scarce, of their communicative utterances, and to modify and improve but consistent with the results of classic research on the develop- them accordingly, needs to be studied in more depth. The current research provides empirical evidence of: The socioeconomic level of the noted by Winsler et al. According to always found; in fact, negative or null relations may be found. The GCI scale has shown have been empirically shown to modulate the complex relation excellent internal consistency. In addition, the construct valid- between private speech and performance. The average general cognitive index GCI score was sage and their resolution, supported by private speech. In con- with a standard deviation of Within the set- pation in the classroom were grouped into pairs in order to facilitate ting of referential communication, the only study that addressed a fluid and symmetrical communicative interchange. Through a nicative exchange. But there was not a relationship found considered bilingual speakers good enough in both languages. On the basis of the above, we can establish that the abilities for referential communication increase with age, allowing children to 2. Design and procedure produce more effective messages for their listeners as they age. In this developmental process, two different verbal sources have to be We carried out a longitudinal study for four years. Participants integrated by the speakers: In the and at 8. The same pairs were maintained across assess- study presented here, we longitudinally analyze the development ments. Of the original 15 pairs, only the 10 pairs available at all of referential communication abilities from 4. Based on data from We focus on the modification of the messages made by the speaker, the age of 4. We expect that the participants at age 4. But at the age of 6. This was also the case for the messages with especially at 8. Method The communicative procedure adopted was based on that devel- oped by Krauss and Glucksberg , in which two subjects sit at 2. Participants a table facing each other separated by an opaque screen that pre- vents any visual contact between them. However, certain changes The participants comprised twenty children who attended were made to increase the ecological validity of the task follow- school regularly. They were drawn from a kindergarten in ing the suggestions made by Lloyd, Boada, and Forns In our Barcelona Catalonia, Spain. The sample was made up of 10 boys procedure, an adult sits between the two children in order to aid and 10 girls distributed in ten pairs assessed at the age of 4 years interaction. She then explained to the children that they were C. Following the explanation, an table. The speaker described the arrange- 2. The aim is to produce of messages: During the process, the adult participated in speech. A when it was interrupted. The task had no time limit. It was consid- message was considered to include private speech when it con- ered to be completed when all of the objects had been named and tained certain types of audible verbal elements that did not appear positioned. All the children finished the task during the three times to be explicitly directed at another person and that indicated a self- they were observed. These elements were considered indicators of private speech only when their intraper- sonal nature could be justified by evidence. We considered three 2. Materials different criteria for such an evidence: It comprises two pictures and a set of eight were produced accompanied by nonverbal behavior that indicated moveable objects. An example just the drawing of the table and the bookcase, and is accompa- of private speech in a message would be: Presence of questions formulated by the listener preceding proximity right, left. Coding ous peer questions. On the basis of the classic distinctions of McTear , we only considered the questions aimed at clarifying an ele- The sessions were recorded on audio and videotape and then ment in the message that was incomplete or ambiguous, that is, for transcribed and coded. Based on the proposal of Boada and Forns identifying the referent or its location. An example of such a ques- , the unit of analysis was the message. It was defined as a tion would be: An example of such a message would be aimed at eliminating ambiguity from the messages were not taken from the speaker: Only the last message was considered from the series of included in the following exchange: Once these messages Listener: In Appendix, we present an example of vate speech utterances, and c whether or not they were preceded each of the resulting eight categories. We present the criteria of classification for Inter-rater reliability for the coding system was estimated by the three variables in detail below. Previously, the two coders were trained and provided with the categorization system, the operational definitions, cate- gorization examples, three coded

transcriptions corresponding to 2. Message modification three dyads, and the respective video recordings. A message was considered as total sampleâ€"were provided and accompanied by the correspond- modified if, after having provided a message about a referent, the ing video recordings. These transcriptions were independently speaker formulates another one about the same referent adding coded by the two trained assistants. In regard to the presence of private speech in the mes- or modification should refer to the identification of the referent or sages, the agreement was In the case of the presence its location. With private speech Without private speech Age Previous question No previous question Previous question No previous question Total Non-modified messages 4. Given the fact that this is a lon- At the age of 4. At the age of 6. Depending on our research questions, we proceeded to were significant. Regarding the effect of the use of private speech, analyze different parts of this whole design. At the age of 8. After observe some changes from ages 4. On the modifications 2. Finally at the age of peers, the speakers did not include private speech in their modi- 8.

- Private Speech, Executive Functioning, and the Development of Verbal Self-Regulation Edited by Adam Winsler, Charles Fernyhough and Ignacio Montero Table of Contents.

Advanced Search Abstract Talking to oneself can be silent inner speech or vocalized for others to hear private speech, or soliloquy. We investigated these two types of self-communication in 28 deaf signers and 28 hearing adults. With a questionnaire specifically developed for this study, we established the visible analog of vocalized private speech in deaf signers. Deaf signers were also found to engage in inner speech, which appeared to have a mostly affirmative character. Together, the findings demonstrate a significantly more frequent use of both inner and private speech in the deaf sample. Research on Sign Language has been rapidly growing over the past decades. However, to our knowledge, one feature of Sign Language has been badly neglected, that is, self-communication and its variants. Talking to oneself is not limited to inner speech but can be expressed, in hearing individuals, as audible private speech or soliloquy. Is there an analog to audible private speech that deaf signers might engage in? This study provides evidence for a form of private speech in deaf signers that is visible to others. Self-communication The disentanglement of the relation between thought and language remains a challenge. Moreover, this relation appears somewhat ambiguous with regard to self-communication. Do we talk silently to ourselves when thinking? Does thinking count as self-communication when only addressed to oneself? Are thoughts necessarily restricted to words? Can they also be expressed with signs, especially when used for self-communicating purposes? Inner Speech We use inner conversation so often that we rarely seem to notice it anymore. As a part of our everyday experience, inner speech is a key component of our being Fields, Because inner speech is so much a part in our daily lives, it comes as no surprise that this familiarity results from a process that had its beginning in early childhood Vygotsky, Fernyhough elaborated on the concept of self-communication and its development from private speech to inner speech. Even though internalized speech has undergone structural changes, it keeps its dialogic character. According to Fields , inner speech serves even more purposes, such as using the inner voice for silent repetition of words that supports learning processes or for reflective deliberation when making decisions or planning actions by silently formulating its necessary steps. In addition, inner speech is beneficial to engaging in inner conversations while including different perspectives on a topic or for staying focused on a problem-solving task. Often the nature of thoughts in stressful moments appears not only to be automatic but also plausible in its evaluating character. What we say to ourselves might unknowingly determine how we act. However, Meichenbaum supports his statement with the fact that a crucial element in behavioral change is not only speaking to oneself but also listening to oneself. Moreover, as a tool for stress prevention, Meichenbaum claims the benefits for individuals trained in consciously initiating inner speech to enhanced adaptive coping strategies. However, this internal dialogue is not only relevant for the process of changing behavior but also has effects on cognitive structure. Thus, the cognitive structure he refers to is by definition the source of the scripts from which inner speech draws its essence. With this distinction, Wertsch intended to avoid confusion with speech that is used in an egocentric way. It is described as such because it stays private and is not obviously addressed to another listener. Alternative terms for spontaneous audible, yet self-directed verbal utterances involve overt self-talk, self-verbalization, self-directed speech or soliloquy. To elaborate the concept of private speech and to distinguish between inner and private speech, reference is commonly made to the four-stage model of the development of inner speech by Fernyhough At Level 1, children and their caregivers interact in characteristic give-and-take of normal conversations, the so-called external dialogue. At Level 2, children take on these dialogues and transform them into open private speech, meaning they talk out loud to themselves until they gradually sub-vocalize their talking to themselves. However, although children employ audible private speech freely, fear of being considered mentally ill by others may prevent adults from engaging in this type of self-communication. Furthermore, Kronk suggested that as children grow older, they

become more aware of social rules, one being that one should not talk to oneself. In her study with adolescents, Kronk found the occurrence of private speech to be profoundly affected by observers in social situations and suggested similar outcomes for adults potentially engaging in private speech. Hence, without creating an atmosphere where social behavior is not under scrutiny, private speech would not be shown. Thus, private speech, or soliloquy, may be beneficial in many ways across the lifespan. John-Steiner classified different functions of soliloquy, such as the verbal exploration of a problem or a situation, confirming utterances or questions or commenting on statements by others. According to the meta-analysis by Hatzigeorgiadis, Zourbanos, Galanis and Theodorakis , the literature on self-communication has provided strong indications that private speech is an effective strategy for supporting learning and enhancing performance. However, the authors concluded that participants—when given a choice—preferred inner speech over private speech as self-talk strategies for enhancing skill acquisition. It seems that self-directed speech, whether it is silent or audible, continues to serve intra-psychological purposes such as self-regulation of behavior throughout adulthood. Against this theoretical background on self-communication and especially considering the different aspects of inner speech and private speech, we set out to explore the issue of self-communication in deaf individuals familiar with Sign Language. Aims of This Study By developing a specific questionnaire, we chose an explorative approach to investigating and comparing ways of self-communication of deaf signers and hearing individuals. The primary goal of the present study was to establish whether deaf signers might employ a visible analog to audible private speech. To our knowledge, this issue has never been explored before. We did not specify the expressive quality of inner speech verbalized vs. Whereas inner speech can adopt positive and negative components, we expected to find more positive inner speech in the deaf sample compared with hearing individuals. We based our hypothesis on the assumption that deaf individuals might benefit more from self-encouragement due to less favorable preconditions in a world of sounds available to most others but not to themselves. Deprived of auditory input, deaf compared to hearing individuals may thus more profit from positive inner speech when growing up in a hearing world. In addition, we expected to find deaf signers to engage in self-addressed Sign Language as a way of communicating to themselves assuming that both signed and spoken soliloquy engender similar benefits. Method Participants A total of 56 participants took part in the study, 28 hearing and 28 deaf adults. Roughly a third of all participants were students 7 deaf vs. The hearing participants were recruited at two universities in Switzerland Fribourg and Zurich and by word of mouth. Deaf participants were reached through advertisements on internet platforms and in a student class of prospective Sign Language teachers in Zurich. The gender distribution was the same in hearing and deaf participants: Table 1 provides an overview of demographic variables of the deaf sample with information concerning the hearing status of their upbringing families, the onset of deafness, the time of acquisition of Sign Language, and the preferred Sign Language used when engaging in signing. All participants provided written informed consent before participating in the study, which was conducted in accordance with the declaration of Helsinki World Medical Association, and had been approved by a local Ethics Committee of the University Hospital Zurich. Table 1 Demographic variables assessed of 28 deaf signers Variables of interest.

Chapter 8 : Inner Speech: Development, Cognitive Functions, Phenomenology, and Neurobiology

Studies of private speech development (see Berk, , Winsler et al., , for reviews) have focused largely on problem-solving tasks of an academic nature, but recently researchers working with referential communication tasks (see Martín, Boada, & Forns, , for review) have begun to explore the role of private and inner speech in solving.

Chapter 9 : "Magic Words" by Andy Clark

Inner speech—also known as covert speech or verbal thinking—has been implicated in theories of cognitive

development, speech monitoring, executive function, and psychopathology.