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4E Cognition Theories

Clinical Formulation Methodology

Highlights

Identification of Brain Structures

Forms of Managerial Intervention

Discovering Thoughts, Inventing Future

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The Clinical Formulation Methodology for Neuropsychological Rehabilitation Intervention: The Comprehensive Model, the Cycle and the Flow Chart for the Rehabilitator's Reference

By Fabricia Quintão Loschiavo Alvares & Barbara A. Wilson
Nexus- Institute for Research, Teaching and Clinic in Neuropsychological Rehabilitation

Abstract- Neuropsychological Rehabilitation (NR) is understood as a process of using a wide variety of strategies deliberately centered on one person, which should stimulate his/her development, or the use of available resources to obtain a good occupational performance. Concerning this point, the intervention must be understood broadly, considering people in their contexts, activities and relationships. In order to attend these principles, the key element for success in proposing an NR plan is the active use, by the rehabilitator, of a clinical formulation process (CF). Considering the infinity of possible influences on an individual's overall level of functioning, the formulation of factors is extremely useful to guide all the people involved, from the clinical team to the patient's family, in order to understand the current problems faced by the person, to delineate the intervention and to prospect for future steps.

Keywords: *neuropsychological rehabilitation, clinical formulation, model.*

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THECLINICALFORMULATIONMETHODOLOGYFORNEUROPSYCHOLOGICALREHABILITATIONINTERVENTIONTHECOMPREHENSIVEMODELTHECYCLEANDTHEFLOWCHARTFORTHEREHABILITATORSREFERENCE

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The Clinical Formulation Methodology for Neuropsychological Rehabilitation Intervention: The Comprehensive Model, the Cycle and the Flow Chart for the Rehabilitator's Reference

Fabricia Quintão Loschiavo Alvares [α] & Barbara A. Wilson [σ]

Abstract- Neuropsychological Rehabilitation (NR) is understood as a process of using a wide variety of strategies deliberately centered on one person, which should stimulate his/her development, or the use of available resources to obtain a good occupational performance. Concerning this point, the intervention must be understood broadly, considering people in their contexts, activities and relationships. In order to attend these principles, the key element for success in proposing an NR plan is the active use, by the rehabilitator, of a clinical formulation process (CF). Considering the infinity of possible influences on an individual's overall level of functioning, the formulation of factors is extremely useful to guide all the people involved, from the clinical team to the patient's family, in order to understand the current problems faced by the person, to delineate the intervention and to prospect for future steps. Based on what was introduced, the main objective of this study was to present this theory in a more practical way, as well as offer pragmatics tools, the NR Cycle and the Flowchart of CF for the intervention in NR for the professionals that work on this area, in order to anchor a more precise and effective practice in the NR. To conclude, a clinical case that aims to contextualize the theory is presented.

Keywords: neuropsychological rehabilitation, clinical formulation, model.

I. Introduction

Neuropsychological Rehabilitation (NR) is understood as a process of using a wide variety of strategies deliberately centered on one person, which should stimulate his/her development, or the use of available resources to obtain a good occupational performance. The intervention must be understood broadly, considering people in their contexts, activities and relationships (Prigatano 1999, Wilson 2002). The fundamental goal is the development of a more adaptive and functional behavior set, aimed at improving quality of life, independence and autonomy (Royal et al. 2007).

According to Wilson (2002), NR is characterized by an individualized approach that identifies and pursues relevant goals for individual patients, contexts and families, and best performance in their occupations. It has as a priority the maintenance and / or development of cognitive skills and compensation for disabilities. It also integrates multimodal methods, conducted by a multidisciplinary and interdisciplinary team (health professionals, educators and all those directly and indirectly related to assistance); and interacts with the individual environment, aiming at transferring the rehabilitation program to the patients´ daily life (Kasper et al. 2015). Thus, the sine qua non condition is to rehabilitate the person, and not their neuropsychological processes (Loschiavo Alvares 2020 a).

Considering what had just been said, the key element for success in proposing an NR plan is the active use, by the rehabilitator, of a clinical formulation (CF) (Loschiavo Alvares 2020 b). This requires the application of a theory and empirical knowledge to the collected information through evaluation in order to derive hypotheses about the nature, causes and factors that influence a patient's current problems or their presentations and behavioral situations. During the formulation process, the countless possible influences on the functioning and neuropsychological status of an individual are taken into consideration.

Hypotheses about the nature, causes and factors that influence the current problems experienced by the patient are used to guide assessment and / or the offering of a rehabilitation plan (Wilson and Betteridge 2019). That being so, the clinical formulation goes beyond the diagnosis, the development of a conceptualization of the current and future clinical picture, of the etiology, mainly covering the management of the patient in the context of his or her multidimensional biopsychosociocultural domains (Loschiavo Alvares 2020 b). Considering the infinity of

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possible influences on an individual's overall level of functioning, the formulation of factors is extremely useful to guide all the people involved, from the clinical team to the patient's family, in order to understand the current problems faced by the person, to delineate the intervention and to prospect for future steps.

In accordance with Sperry et al. (1992), the formulation is a process of linking a group of data and information to define a coherent pattern, helping to establish the diagnosis and tracing the appropriate intervention, providing explanations, in order to prepare the rehabilitator, the patient and family for therapeutic work and goal setting. The formulation also helps to gather the results of many evaluations carried out by different team members in a single coherent source. Therefore, it requires a description of what happened to the patient and the pathology or diagnosis, covering all the functional consequences. It is also necessary to know the family and social contexts and how the person sees himself or herself before the injury or illness.

From the perspective of the NR, the CF involves the entire process of clinical structuring for intervention, including the establishment of goals, the measurement of efficacy: in short, a comprehensive flowchart, from which there is the identification of the key characteristics of the patient, the definition of the intervention´s targets, the specification of the desired results, contextual and occupationally significance, the design of the interventions, the implementation and the constant reassessment, based on functional and contextually relevant parameters. Based on what was introduced, the main objective of this study was to present this theory in a more practical way, as well as offer pragmatics tools for the professionals that work on this area, in order to anchor a more precise and effective practice in the NR.

II. The Comprehensive Model of NR for Psychiatric Disorders

In 2002, Wilson published a model of cognitive rehabilitation arguing that "Cognitive rehabilitation is a field that needs a broad theoretical base incorporating frameworks, theories, and models from a number of different areas". No one model or group of models is sufficient to address the complex problems facing people with cognitive problems consequent upon brain injury" (Wilson 2002). Models and theories influencing cognitive rehabilitation include those of cognition, assessment, recovery, behaviour, emotion, compensation and learning. Wilson synthesised these individual models and theories into a comprehensive model of cognitive rehabilitation, which has been used to plan rehabilitation programmes specifically for people with acquired brain injury (Wilson et al. 2013). As far as we know, this comprehensive model has not been employed in rehabilitation for people with psychiatric disorders, despite the fact that cognitive impairments are common in these populations and contribute to restrictions in everyday life functioning (Rosenheck 2006, Samuelson et al. 2006, Corrigan et al. 2007, Grant and Adams 2009, Bearden et al 2011, Volkow et al 2011); and based on that, in 2018, Loschiavo Alvares, Fish & Wilson expanded this model and also added the specificities related to the clinical population with neuropsychiatric disorders. This is the model proposed here, as an anchor for the entire clinical process. (see Loschiavo Alvares and Wilson (2020). It consists of four distinct sections, with topics of specific interest for each, namely: person specific considerations, condition specific factors related to the diagnosis, theoretical concerns and, finally, the patient's, family and environmental considerations.

Initially, the patient's clinical history will be required. This will consist of: the age at the beginning of the disorder; number of hospitalizations; family and developmental histories; possible substance use and risk of suicide; the impact on health condition; psychological factors and possible effects on NR (stigma, personality, experiences of failure, low self-esteem, negative beliefs and coping styles, anxiety and mood); the functional status (Loschiavo Alvares, Sediyama, Rivero et al. 2011) (by using the International Classification of Functionality - ICF and other assessments that are relevant to the case); and the Expected and Observed Cognitive Profile, which considers the neuropsychological profiles expected for each disorder, already well described in the literature and comparing them with the findings of the neuropsychological evaluation to determine cognitive strengths and weaknesses.

Diagnostic considerations would include the Pharmacological Intervention, which aims to understand the impact of pharmacotherapy on mood and cognition; also, the Biological Influences and Global Prognosis, which would include the neuroprogression and allostatic load, which, taken together, will allow the rehabilitator to note their patient's prognosis.

Theoretical concerns, the third section, on the other hand, consists of Complementary Models, the neuropsychological, behavioral, cognitive behavioral, systemic, which should use a broader understanding of the patient's context; the Scientific Approach, from which there is the postulate that NR should always be an evidence-based process, adopting, therefore, the scientific basis in the evaluation and proposition of new interventions; and the Intervention Focus (s), that helps the rehabilitator to consider the specifics of each case to determine the focus of their intervention. This last named can be one or a combination of the following: restoration of function and / or encouragement of neuroanatomical reorganization, use of residual skills more efficiently, or search for alternative paths, environmental changes.

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Finally, there are considerations of the patient, family and contexts that involve the determination of instruments to evaluate the effectiveness of the intervention; the process of setting goals with the patient and family, the NR implementation and constant monitoring of its evolution with periodic reviews and updates according to evolutions, and / or new demands and functional goals that need to be stablished.

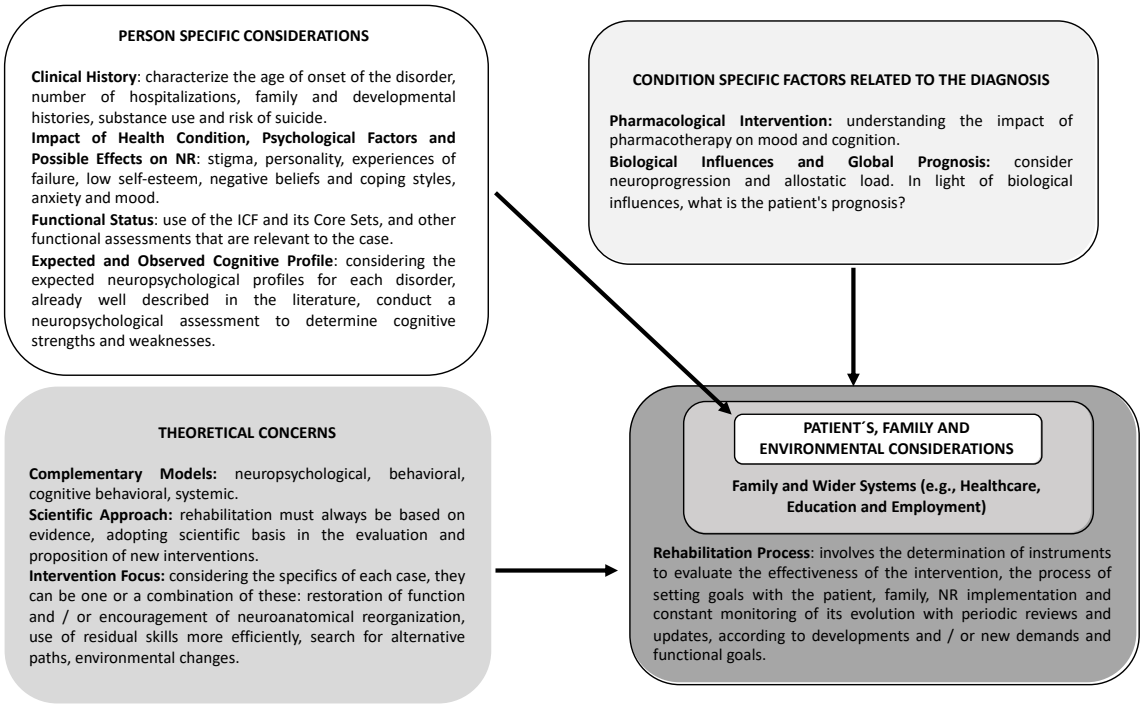


Figure 1: The Neuropsychological Rehabilitation Model proposed by Loschiavo Alvares and Wilson (2020), Loschiavo Alvares, Fish and Wilson (2018).

An extension to the model has been proposed by Loschiavo Alvares, (see Fig 2) which reflects the synergy and intersection of the components of the sections of the above model. This cycle was idealized and outlined as an intermediate tool, in the sense of being the empirical translation of the Loschiavo Alvares & Wilson´s (2020) model. Thus, the cycle brings a structured approach regarding the management of rehabilitation, which includes all tasks, from the analysis and identification of problems, demands for the NR, to the measurement of the effectiveness of the intervention, involving the patient, family and contexts on the clinical decision-making.

It also brings, in its essence, the dynamic and interactive proposal of all the based components of the Comprehensive Model of Neuropsychological Rehabilitation by Loschiavo Alvares & Wilson (2020), according to the four sections mentioned before, which are represented by the small gears, as captioned in the upper left corner of the figure. Thus, each component of this model is synergistically associated with others and makes up each step of the NR cycle. See figure 2.

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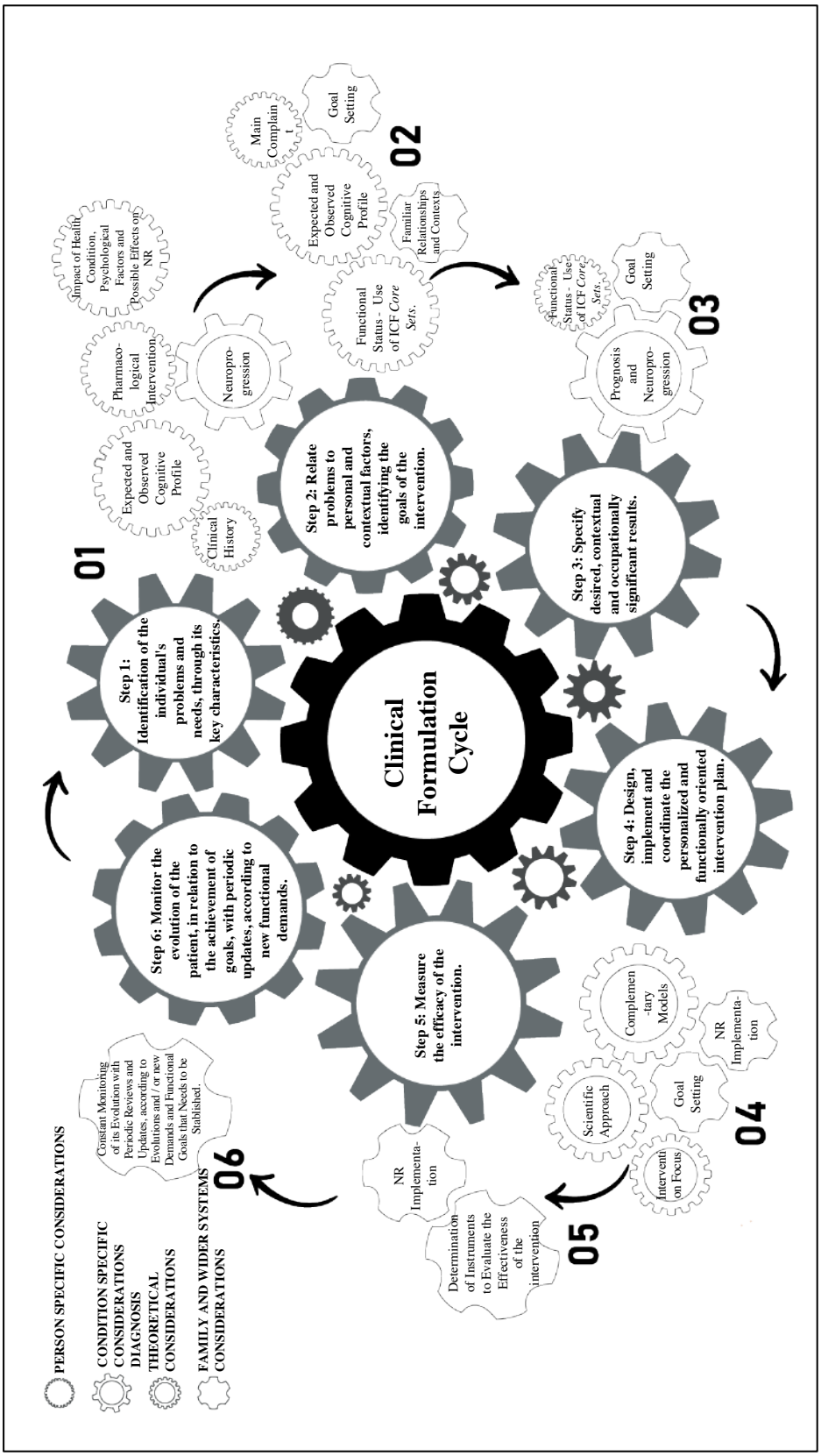


Figure 2: The NR Clinical Formulation Cycle

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In fact, there is no "cake recipe" to be followed for the conduct of NR, but it is possible to draw coordinates so that we may have guidelines and an initial route to follow, emphasizing that the collateral routes will always be determined by the patient, with his or her own history, individuality and unique characteristics. Finally, when we get there, how can we then utilize the postulates of the Neuropsychological Rehabilitation Model, by Loschiavo Alvares & Wilson (2020)? How do we employ the whole framework built up to this point as a guiding principle?

The answer is by using the cycle above as a practical tool, in the sense of being the empirical translation of the NR model. Thus, the cycle brings a structured approach regarding rehabilitation management, which includes all tasks, from the analysis and identification of problems, demands for the NR, to the measurement of the effectiveness of the intervention, involving the patient, family and contexts in the clinical decision making.

It also comprises, in its essence, the dynamic, interactive and synergistic proposal of all the basic components, which until then were presented in a fragmented way only as a didactic resource, ranging from the clinical formulation to the intervention in NR. The cycle consists of six steps, that is, its coordinates for the clinical formulation for NR, namely:

- Step 1: Identification of the individual's problems and needs, through its key characteristics.
- Step 2: Relating problems to personal and contextual factors, identifying the goals of the intervention.
- Step 3: Specifying desired, contextual and occupationally significant results.
- Step 4: Designing, implementing and coordinating the personalized and functionally oriented intervention plan.
- Step 5: Measuring the efficacy of the intervention.
- Step 6: Monitoring the evolution of the patient, in relation to the achievement of goals, with periodic updates, according to new functional demands.

What about the range of each coordinate? What are the guidelines? For each step, there is a path composed of the components of the Rehabilitation Model and in order to build it in a more tangible way, in order to build the methodology so that the rehabilitator, fully understands it, follow Table 1 below: this Table demonstrates the intersections between the coordinates, the steps of the rehabilitation cycle, and the guidelines, being the components of the NR Model (Loschiavo Alvares & Wilson 2020).

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Table 1: The intersections between the steps of the NR Cycle - the Coordinates - and the components of the NR Model - the Guidelines

COORDINATES X GUIDELINESS		THE NR MODEL´COMPONENTS			
		PERSON SPECIFIC CONSIDERATIONS	**CONDITION SPECIFIC CONSIDERATIONS DIAGNOSIS**	**THEORETICAL CONSIDERATIONS**	**FAMILY AND WIDER SYSTEMS CONSIDERATIONS**
STEPS OF THE NR CYCLE	Step 1: Identification of the individual's problems and needs, through its key characteristics.	Clinical history; Impact of Health Condition, Psychological Factors and Possible Effects on NR.	Pharmacological Intervention; Biological Influences and Neuroprogression.	-	-
	Step 2: Relate problems to personal and contextual factors, identifying the goals of the intervention.	Expected and Observed Cognitive Profile.	-	-	Main Complaints: Goal Setting and Familiar Relationships and Contexts.
	Step 3: Specify desired, contextual and occupationally significant results.	Funcional Status	General Prognosis - Biological Influences / Neuroprogression.	-	Goal Setting.
	Step 4: Design, implement and coordinate the personalized and functionally oriented intervention plan.	-	-	Complementary Models; Scientific Approach and Intervention Focus.	Goal Setting and NR Implementation.
	Step 5: Measure the efficacy of the intervention.	-	-	-	NR Implementation; Determination of Instruments to Evaluate the Effectiveness of the intervention .
	Step 6: Monitor the evolution of the patient, in relation to the achievement of goals, with periodic updates, according to new functional demands.	-	-	-	NR Implementation; Constant Monitoring of its Evolution with Periodic Reviews and Updates, according to Evolutions and / or new Demands and Functional Goals that Needs to be Stablished.

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And in order to clinically employ the rehabilitator, based on all the theoretical assumptions presented here, the following flowchart (Figure 3) is proposed for the proposition of an NR plan, leaving it as a methodological reference for the translation of the theory into practice in NR intervention, emphasizing that the same can be applied to cases of both acquired brain injuries, as well as neuro developmental and psychiatric disorders.

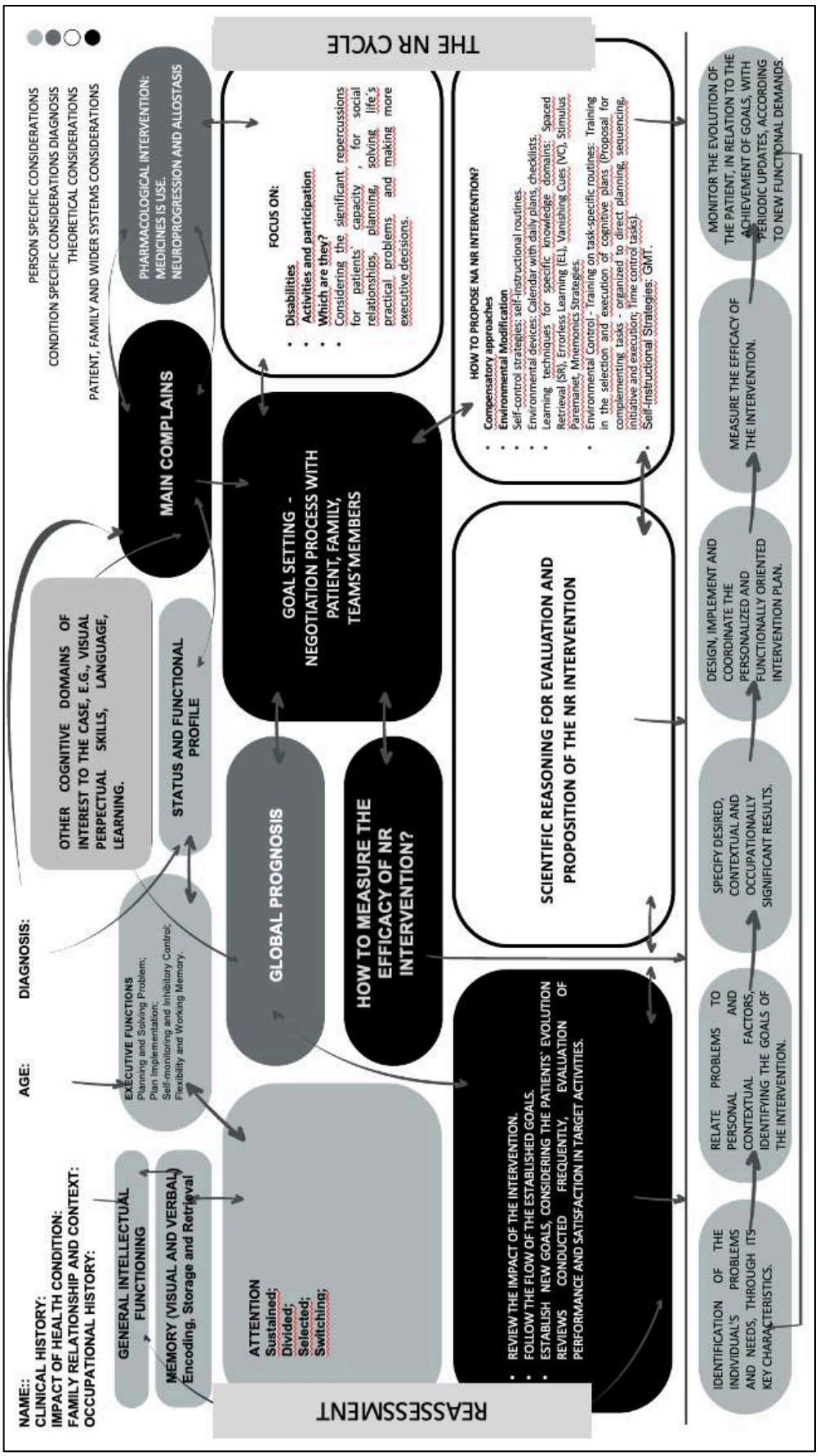


Figure 3: Flowchart of clinical formulation for the intervention in NR (Loschiavo Alvares & Wilson 2020)

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How to Apply the Flow Chart of CF? A Summary of a Clinical Case

Considering all presented above and aiming to demonstrate how to gather all this information together, we describe a clinical case.

P.G., Woman, 52 years old, retired, diagnosed with bipolar disorder type I, since she was 23. Concerning her clinical history, there were in total 21 suicidal attempts, and the last one was in 2010, when a piercing-blunt wound was self-inflicted in the orbitofrontal cortex bilaterally. Subsequently, about 30 days after this event, as the self-aggressive behaviors persisted, a bilateral tonsillectomy was conducted.

According to a familiar informant, the patient has shown a slower functioning, difficulties of concentrating, is unable to tackle an activity to the end, is unable to organize and sequence her daily tasks. "She is paralyzed, does not engage in any goal, she wants, she feels, she does, without any planning", her mother said. "My memory is over. I no longer remember anything," P.G. reinforced.

The analysis of the pattern of adaptive difficulties faced by P.G. does not suggest any substantial qualitative change, when comparing her situation prior to brain injury with the current situation. The differences are more of an intensity. In summary, the results from the neuropsychological assessment have shown dissociation between the functions of circuits related to the prefrontal cortex dorsolateral, which were the prefrontal cortex ventromedial. Considering the tasks related to contextualized cognition, P.G. also presented a characteristic pattern of impairment regarding the lack of monitoring, impulsivity, myopia for the future, difficulties in anticipating the consequences of her own behavior, cognitive-behavioral dissociation, difficulty in making inferences and integrating implicit non-verbal information, and finally, explicit deficits regarding the decision-making process.

Aiming to connect the information from the cognitive deficits up to the strategies of intervention, table 2 is presented below.

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Table 2: The big picture of P.G. ´s case

COGNITIVE FUNCTIONS	COGNITIVE DEFICITS	OCCUPATIONAL´S IMPAIRMENTS: PATIENT AND FAMILY´S MAIN COMPLAINS	INTERVENTION´S GOALS	STRATEGIES OF INTERVENTION
Attention and Memory	• Low resistance to distracting stimuli, attention difficulties.	• She has difficults in learning. She can not retain new content, e.g. studies of the new language and postgraduate subjects.	• Improve her capacity of learning new contents in 75%.	• Self-control strategies: self-instructional routines. • Environmental devices: Calendar with daily schedules, checklists. • Techniques for learning specific knowledge domains: spaced retrival, errorless training and vanishing cues.
Executive Functions	• Impulsivity • Difficulties in planning - sequencing, organization, decision making, time management and problem solving.	• She has difficulties in sustaining her behaviour, for example, she has problems in maintain a proper conversation (she can not tackle new things, e.g., a subject to the end); • She is unable to organize herself and proceed with the activities, so she does not perform any instrumental activities of daily living (IADL), she does not cook. • She can not complete a new multi-step tasks such as: paying bills using the internet banking, managing Uber App, doing her translations for the charity she is a volunteer. Concerning this last point, P.G. Works as a volunteer in a charity that supports women in a risk situation. She is responsible for translating texts from English to Portuguese language, which are part of its website	• Improve her ability the to hold a conversation in 75%. • Organize herself for the performance of activities in the target contexts, such as preparing a simple meal. • Develop strategies for: • managing the internet banking (paying bills monthly) and UBER App (be able to use this app for her locomotion around the city), • Proceed with the translations for the charity she is a volunteer, without the assistance of her mother.	•Environmental control • Training on task-specific routines • Training in the selection and execution of cognitive plans (Proposal for complementing tasks - organized to direct planning, sequencing, initiative and execution; Time control tasks) • Self-instructional therapy, e.g. Goal Management Training (GMT).

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III. Final Considerations

The main pillar for conducting a NR program is the process of clinical formulation as shown in figure 2. It is the master cog that makes all the other components integrate in a synergistic and orchestrated way. It is up to the rehabilitator, that is the one who, regardless of their basic graduation, health, education and professionalism, will perform in NR, the construction and sedimentation of this process so that the intervention is anchored on a solid, scientifically supported and functionally significant basis, indispensable prerequisites for therapeutic success. In this way, the professional /clinician is the best researcher and the converse is also true. Seeing the patient as a research project implies globally analyzing the case and all the variables involved, from the component to the function and vice versa, establishing hypotheses and goals, setting short, medium and long-term objectives, defining the most appropriate intervention with the selection of the most pertinent strategies, and analyzing its impact, using objective methods for evaluating effectiveness. The entire NR process must be parameterized by factors with functional ballast.

Considering the evidence-based practice, it is up to the professional to always use the scientific evidence available in the literature to select the most appropriate intervention (Ward, 2003), supporting their clinical reasoning with the single and greatest objective of promoting the functionality of the patient. This process of reflecting, planning, guiding and conducting treatment, requires the therapist to employ a metacognitive analysis, that is, the ability to think and reflect on the clinical decision making process, hence, reasoning, applied to a given situation. In this way, therapeutic actions will always be properly oriented to meet the interests and goals of the patient and the family in the NR process.

Aligned to what was presented above, the clinical formulation process as proposed here, is like a compass, through which the rehabilitator will have all the coordinates and guidelines to outline the intervention plan for his/ her patient, at the same time that he will find, from our flowchart, all the parameters to change this plan, according to the new demands, in a flexible and functionally oriented way.

References Références Referencias

1. Bearden CE, Shih VH, Green MF, Gitlin M, Sokolski KN, Levander E, et al. (2011). The impact of neurocognitive impairment on occupational recovery of clinically stable patients with bipolar disorder: a prospective study. *Bipolar Disorder* 13, 323-333.
2. Corrigan PW, Mueser KT, Drake RE, Solomon P (2007). *The Principles and Practice of Psychiatric Rehabilitation: An Empirical Approach*. Guilford, New York.
3. Grant I, Adams KM (2009). *Neuropsychological assessment of neuropsychiatric and neuromedical disorders*. 3rd ed. Oxford University Press, New York.
4. Kasper E, Ochmann S, Hoffmann W. et al. (2015). Cognitive rehabilitation in Alzheimer's disease – a conceptual and methodological review. *J Prev Alzheimers Dis* 2, 142- 152.
5. Loschiavo Alvares FQ, Sediyama CYN, Rivero TS, et al (2011). Tools for efficacy's assessment of neuropsychological rehabilitation programs. *Clinical Neuropsychiatry* 8, 3, 1-11.
6. Loschiavo Alvares FQ, Fish J, Wilson BA (2018). Applying the comprehensive model of neuropsychological rehabilitation to people with psychiatric conditions. *Clinical Neuropsychiatry* 15, 2, 83-93.
7. Loschiavo Alvares FQ, Wilson BA (2020). *Reabilitação Neuropsicológica nos Transtornos Psiquiátricos – da teoria à prática.* Editora Artesã, Belo Horizonte.
8. Loschiavo Alvares FQ (2020 a). *Manual para a Aplicação dos Core Sets da Classificação Internacional de Funcionalidade (CIF) na Reabilitação Neuropsicológica dos Transtornos Psiquiátricos*. Editora Artesã, Belo Horizonte.
9. Loschiavo Alvares FQ (2020 b). *Manual para a Formulação Clínica para a Intervenção em Reabilitação Neuropsicológica*. Editora Artesã, Belo Horizonte.
10. PRIGATANO G (1999). *Principles of neuropsychological rehabilitation*. Oxford University Press, New York.
11. Rosenheck R (2006). Barriers to Employment for People with Schizophrenia. *American Journal of Psychiatry* 163, 411- 417.
12. Royall DR, Lauterbach EC, Kaufer D, et al (2007). The Cognitive Correlates of Functional Status: A Review from the Committee on Research of the American Neuropsychiatric Association. *Journal of Neuropsychiatry Clinical Neuroscience* 19, 3.
13. Samuelson KW, Metzler TJ, Rothlind J, Choucroun G, Neylan TC, Lenoci M, et al. (2006). Neuropsychological Functioning in Posttraumatic Stress Disorder and Alcohol Abuse. *Neuropsychology* 20, 716-726.
14. Sperry L, Gudeman J, Blackwell B, et al (1992). *Psychiatric case formulations.* American Psychiatric Press, Washington, DC.
15. Volkow ND, Baler RD, Goldstein RZ (2011). Addiction: pulling at the neural threads of social behaviors. *Neuron* 69, 599-602.
16. Ward JD (2003). The nature of clinical reasoning eith groups: a phenomenological study of an occupational therapist in community mental health.

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The American Journal of Occupational Therapy 57, 8, 625-634.

17. Wilson BA, Betteridge S (2019). *Essentials of Neuropsychological Rehabilitation.* Guilford Press, New York.
18. Wilson BA (2002). Toward a comprehensive model of cognitive rehabilitation. *Neuropsychological Rehabilitation* 12, 97- 110.
19. Wilson BA, Ashworth F, Winegardner J (2013). Neuropsychological Rehabilitation after Traumatic Brain Injury: Two case studies. In: Muenchberger H, Kendall E, Wright J, editors. *Health and Healing after traumatic brain injury*. Praeger Press Westport CT, USA, p. 169-186.

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Embodied Mind and Neural Underpinnings of the Aesthetic Experience. A Case Study from the German Eighteenth Century: 4E Cognition Theories Forecasted by Johann Gottfried Herder

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Abstract- Recent theories within the avenue of the bio-cultural turn, and particularly about embodied cognition are forecasted in the anthropological, philosophical, physiological and scientific debate of the late 18th century in Germany. Philosopher and theologian Johann Gottfried Herder contributed to this discourse sigificantly, opening up new perspectives on the link among thought and language and body. In this paper we aim at highlighting some core issues of Herders's discourse about knowledge, perception and cognition, that seem to anticipate some of the most recent *4E Cognition* issues.

Keywords: Embodiment, embodied cognition, anthropology, knowledge, neuroscience.

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EMBODIEDMINDANDNEURALUNDERPINNINGSOFTHEAESTHETICEXPERIENCEACASESTUDYFROMTHEGERMANEIGHTEENTHCENTURY4ECOGNITIONTHEORIESFORECASTEDBYJOHANNGOTTFRIEDHERDER

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Embodied Mind and Neural Underpinnings of the Aesthetic Experience. A Case Study from the German Eighteenth Century: 4E Cognition Theories Forecasted by Johann Gottfried Herder

Renata Gambino [α] & Grazia Pulvirenti [σ]

Abstract- **Recent theories within the avenue of the bio-cultural turn, and particularly about embodied cognition are forecasted in the anthropological, philosophical, physiological and scientific debate of the late 18th century in Germany. Philosopher and theologian Johann Gottfried Herder contributed to this discourse sigificantly, opening up new perspectives on the link among thought and language and body. In this paper we aim at highlighting some core issues of Herders's discourse about knowledge, perception and cognition, that seem to anticipate some of the most recent *4E Cognition* issues.**

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I. Introduction

Johann Gottfried Herder is considered a key figure in the German culture of the *Aufklärung* for his well-known merits as philosopher, anthropologist, theorist of aesthetics and poetry, but surprisingly enough some of his theories have become subject of renewed interest by current philosophical and scientific discussions about human mind and cognition. In particular, growing attention for his works has aroused in the transdisciplinary field of biocultural anthropology and in cognitive research (see: Alert; Waldow & DeSouza; Gaier; Weiler). Whereby several recent studies reinterpreted Herder's theory of knowledge, his philosophical anthropology, his reflections on the origin of language, on aesthetic perception, and on empathy as deeply innovative and overcoming the medical, anthropological and aesthetic discourse of his time (see Sauder, *Sinnliche* 137-153). Indeed, Herder played a crucial role in examining some mental and cognitive processes underlying the aesthetic production and reception: he deeply reflected about the unity of the mind-body system in any knowledge process, i.e. he considered it as depending from the interaction between the physiological dimension. Linking philosophy, anthropology, ethnography and history, he laid the foundations not only for the constitution of the cultural sciences, but also for the cognitive ones. His work, which was partly overshadowed by the prevailing Kantian vision, is now re-evaluated by recent studies, which consider it profoundly innovative and precursor of modern cognitive issues:

> Herder is very much a thinker of our time. Instead of approaching facets of human existence in an isolated fashion, he brings the entire human being into focus by tracing its connection with the natural, cultural and historical world. […] Herder's Anthropology resonates with many demands and needs arising today, when national and cultural interests - and conflicts - take on new, and old, forms in the wave of unprecedent global changes. (Waldow and DeSouza, *Introduction* 219).

In a recent book with the title *Herder: From Cognition to Cultural Science*, we find the work of the thinker revisited in a transdisciplinary perspective, which highlights the polyphony of Herder's innovative approaches to the philosophy of history, language, ethnography, poetry and, in particular, to his definition of the cognitive processes as embodied processes, i.e. rooted in bodily and sensory perception. The transdisciplinary dimension of Herder's research leads to the elaboration of an intimately organic vision of knowledge rooted both in the human bodily perceptual dimension and in history. This has been highlighted by various studies, that point out how "[...] history itself is to be considered as connected to an organic-morphological genetic research [...]" (Marelli 13), which is part of "[...] a theoretical reflection on the arts, starting from the specificity of sensorial experiences [...]" (Marelli 13), and reaching out to "[...] a re-foundation of philosophy as a science focused primarily on the human being and committed to safeguarding and harmonizing all his faculties, expressions and developments" (Marelli, 14).

This brings us back to the definition of "embodied mind", which finds an articulated theorization also in Herder's work, obviously expressed in the language of his time. He, therefore, created the epistemological framework for a humanism, that places the individual at the centre of a complex biological and cultural system, determining the subject and determined by him in turn:

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> At the heart of this anthropology is a conception of human beings as primarily sensible animals whose unique linguistic and rational capacities are constitutively shaped by their historic-cultural circumstances, which they reproduce and shape in turn. Herder grounds this conception in both a naturalistic account of human development and a metaphysics and epistemology of which soul-body interaction is a central feature. This conception forms the basis of Herder's challenge to, and reinterpretation of, well-established conceptual distinctions, such as those between nature and culture, animal and human, reason and sensibility. (Waldow and DeSouza 259-265).

The fundaments of the philosophical thought of the *Aufklärung* are re-elaborated by Herder in terms of a new epistemological framework referring to a conception of knowledge as a dynamic and rhizomatic phenomenon: "[…] [Herder's] philosophy is at its best […] when it learns from and enters into an ongoing conversation with disciplines such as history, political science, anthropology, medicine, and biology." (Gjesdal 3).

Within this vision of knowledge, Herder highlights the profound interconnection among biological existence, mind cognitive processes, knowledge and artistic creation, building a vision of the body-mind unity which, in our opinion, anticipates the theories on embodiment put out by recent cognitive sciences, starting from Humberto Maturana and Francisco Varela (see Maturana and Varela, *Autopoiesis)*, further developed by Vittorio Gallese (see Gallese, *Embodied* 2018, 31-46; *Problem* 70-79; *Naturalizing* 50-59; *Empathic*; *Arte* 49-67; *Corpo* 8-24; *Motor* 486-498; *Before* 659-669; *Finding*; *Embodied* 2004, 23-48) and newly giving rise to the heuristic framework of *4E Cognition* (see for further discussion Newen *et al*). This last heuristic frame regards the functioning of the human mind not in terms of the representational and computational model of first-generation cognitive sciences, but relating it to the physical dimension of the body interacting with the environment: the human mind is therefore considered as 'embodied', rooted in corporeity ('embedded'), 'enacted' and 'extended' (see Newen *et al*). This perspective is considered crucial within the bio-cultural turn (see Wojciehowski and Gallese) for its multiple implications in the field of aesthetics and reception of the arts.

Herder's reflection moves from a unitary biological vision of the human being: he starts from the inquiry about human perceptions and sensations, through which the subject opens up to the world, i.e. the body creates his/her own vision of the world, aimed at a knowledge that has as its supreme goal in the "best for the community" ("*zum Besten des Volkes*") (Herder, *Philosophie* 122). Therefore, many further core concepts of Herder's theories, like his conception of language, move from a biological vision of the human being, considering physiological sensitivity, perception and impulses in their interaction with the environment as essential engines of the faculty of thought, speech and consciousness, placing language as a priority over the formation of consciousness. Herder sets the basis for a science that not only reaffirms the unified vision of the human being, but also aims to advance mankind's evolution and the perfectibility of the humankind (*Beförderung der Humanität*).

In order to highlight how some of the pivots of Herder's thought constitute an anticipation of the theories on embodiment, we will first briefly present the core ideas of the embodiment theories and of the four key concepts of the *4E Cognition*, referring these last to the relative corresponding precursor concepts theorized and discussed by Herder; further we will relate Herder's concepts to the current epistemological frame.

II. Embodiment in Neurocognitive Theories

The interaction of body, mind, and environment is at the core of the embodied mind theory, according to which every mental act is rooted in the body, influenced by it, and in turn determined by it. This heuristic frame has had a significant impact on the anthropological, philosophical, and aesthetic discourse about the human being and its production, giving rise to new transdisciplinary fields of research such as neuroaesthetics and neurohermeneutic, which investigate the artwork as a product of the fundamental faculties of the mind, sheding new light on phenomena such as empathy, immersion and, in general, literary and aesthetic reception (see Gambino and Pulvirenti 2019). More specifically, the concepts of embodiment and embodied mind refer to the physiological and biological mind-body unity as a premise for every form of subjectivity, consciousness, thought, artistic production and social interaction. The term embodied cognition enables us to overcome the nature/culture dichotomy, referring to cognitive processes considered in biological terms as dependent on the interaction among mind, body and environment. Such theories have profound implications in the study of complex phenomena, such as thought, emotion, perception, language, conscious feeling of the Self, understood as an entity capable of feeling, remembering and narrating its experience in the world (see Damasio for further discussion).

Within this field of research, specific phenomena have been focused on, such as those of intercorporeality, intersubjectivity and embodied simulation, investigated particularly by Gallese (see Gallese and Cuccio), who takes up, as far as intersubjectivity is concerned, the concept developed by Husserl in *Ideas for a Pure Phenomenology*, and in *Cartesian Meditations*, further inquired by other

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phenomenologists (such as Max Scheler, Edith Stein) and, more recently, by Dan Zahavi.

In Gallese's theories the concepts of intercorporeality and intersubjectivity refer to neuroscientific acquisitions such as those about mirror neurons, highly significant in transdisciplinary investigation. The concept of embodied simulation (see Gallese *et al.*, Rizzolatti and Sinigaglia) is a cue issue for understanding the processes of aesthetic reception. According to its main assumptions, an observed action gives rise in the observer to a process of imitative replication within a mental simulation, which is based on the activation of the sensorimotor cortex. The principle of embodied simulation is fundamental for the immediate understanding of actions and emotions of others, since it constitutes a direct, pre-reflexive and pre-conceptual access to actions, emotions, thoughts and behaviors of others. This happens on the basis of the motor simulation, which is part of the phenomenon studied and defined by Gallese as motor cognition (see Gallese): cognitive abilities, such as the identification of motor aims in the behavior of others, as well as the anticipation of an action, are possible on the basis of the functional architecture of the motor system, which in turn is organized into motor acts with specific aims. In fact, there is a close anatomical and functional relationship between action and semantics, i.e. a sensorimotor integration between the action of the subject in relation to an object and its meaning. Some cerebral areas (among these the frontal, parietal and temporal ones) produce a 'copy' of each motor scheme used to perform actions in the world coding it on the base of the 'goal of that action' (i.e. taking, pushing, pulling, etc.) (see Gallese *et al.*). Therefore, in Gallese's view, the brain operates through a prelinguistic understanding of a motor-pragmatic nature. This 'motor language' is shared by all human beings (intercorporeality), who are thus able to immediately understand the purpose of the motor acts of others (intersubjectivity) (see Gallese and Iacoboni for further discussion). Such processes are activated not only by witnessing to an action performed by others, but also by imagining a motor act. This allows the human being to understand and anticipate the purpose of a perceived action. This motor language is constantly active, both in the understanding of an observed action and in the relationship that has to be established with the objects of the world. On its turn, this pre-linguistic dynamic feature of human communication allows to create a positive and functional relationship with the world and with others, allowing us to be social creatures (Cuccio *et al*. 69; Rizzolatti and Sinigaglia, *So* 4).

The processes of embodied simulation and the shared motor language are at the origin of the phenomenon of empathy, by which we mean the "ability to imagine oneself instead of others and understand the feelings of others" (Iacoboni, *Existential* 310). This ability allows human beings to understand actions and situations referring to a mimetic principle, by mirroring what is perceived in one's mind and body (Gallese, *Io* 38). Empirical studies suggest that imitation plays a fundamental role in empathic feelings: in order to understand not only the actions, but also the emotional states of others, human beings activate the same neural systems involved in the expression of the emotions of others as if they were personally experiencing it. Moreover, empirical studies suggest a correspondence between the phenomenon of empathy and the existence of a 'mirror system' at the neural level, capable of encoding both transitive and intransitive motor acts and their sequence of movements, 'firing' also in case of mimed actions (see the groundbreaking studies of Gallese, Rizzolatti and the team of Parma, about mirror neurons and premotor cortex).

The complex embodied processes imply a sort of emotional and cognitive visceral motor resonance, determining an understanding of the emotions and sensations felt by others on the basis of an intentional consonance, in which the subject 'puts himself in the place' of another, maintaining his own otherness. On the basis of this hypothesis empathy turns out to be the result of unintentional associations between one's own body and that of others, or between one's own body and the bodies of characters in a fictional world, since the same simulation mechanism allows the reader to access the emotions of real and fictional characters in a second-person perspective relating what happens to one's own experience (see Gallese for further discussion).

Surprisingly enough, many of these concepts have been forecasted and formulated in eighteenth-century terminology by Herder. Before explaining the fundamental issues of his theory, we will briefly discuss the main aspects of embodiment theories by classifying them according to the categories of the most recent researches on embodied cognition, i.e. the qualities of the mind as: a) embodied, b) embedded, c) enacted, d) extended, referring to the corresponding principles of Herder's theorization, which we will deal with further on.

a) *Embodied Mind (in Herder*: Commercium mentis et corporis, Nervengebäude / "Nervous system", Reize / Stimuli, Sinne / Senses)

The linkage among physiological, mental and cognitive processes, summarized in the concept of embodied mind, was revolutionary highlighted by Humberto Maturana and Francisco Varela in their studies *Autopoiesis* (1980, 1985) and *The Tree of Knowledge* (1987). In these works, the two scientists investigated the embodied mechanisms of creation, self-regulation and cognition of living beings from a biological perspective. Synthesizing the complex theories of Maturana and Varela, life on earth is regulated by a process of autopoiesis, according to

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which each living unit self-regulates itself, maintaining its own identity through its actions, i.e the organization of the system defines its features and its identity. Being, acting and knowing coincide within the autopoietic organization, i.e a network of continuous dynamic interactions among the molecular components of each cellular unit, produced through metabolic dynamics as distinct elements, but all interacting within the surrounding environment (see Varela *et al.* for detailed studies) (see in Herder the ideas about the *Ganzer Mensch / whole man, the commercium mentis et corporis*). Multi-cellular living beings are characterized by their sensory and motor components and their dynamic modes of relation in the nervous system, whose architecture is universal, but whose complexity and breadth change in the various living beings. According to Varela and Thompson, active and bodily relationships are part of the double embodiment of the mind in the body and of the body in the environment (see in Herder the concepts: *Nervengebäude*, *Reize*, *Sinne*):

> By using the term embodied we intend to highlight two essential issues: 1) cognition depends on the experience gained from having a body with different sensorimotor capacities; 2) these individual and subjective sensorimotor capacities are in turn embodied in a wider context of biological, psychological and cultural nature. (Varela *et al., Embodied* 172-73).

Other scholars, including Johnson and Rohrer, referring to James and Dewey's pragmatism, and especially to the principle of continuity postulated by the latter, have theorized the absence of ontological differences between biological functions and higher brain functions resulting from organic levels:

> In explaining the very complex 'higher' functions, such as introspection or language, we do not refer to new ontological entities, new dynamics or new processes, but only to natural ones. More complex levels of organic functions are just that: levels, nothing else, emerging properties of 'superior' functioning [...]. According to this assumption of continuity, every dynamic of the mind, and even the faculties of reasoning and abstract conceptualization, must be rooted in the organic faculties of perception, sensation, manipulation of objects and bodily motion. Social and cultural forces operate, in turn, to develop these faculties, including language and symbolic reasoning, until they reach their maximum potential. (Johnson and Rohrer 21).

The emotional dimension (about which Herder, as we shall see, has surprising insights in relation to the bodily nature of the *Empfindung*) is also an embodied phenomenon, which participates in thought. Deacon (Deacon 37), to mention just one example, states that emotion is not distinct from cognition and cannot be dissociated from it, since it plays a central role in knowledge through art. This involves the manipulation of emotional experiences integrated into complex phenomena that determine the emergence of new concepts and ideas.

b) *Embedded Mind (in Herder: Analogon, Unity of the existing)*

The nervous system, according to many scholars including Colombetti and Thompson, acts by developing "coherent configurations of meaning" (Colombetti and Thompson 85) that vary according to different contexts. As a result, the human being, intended as an autonomous system, does not passively receive information from the environment but in relation to it. Cognition is therefore an embodied emergent process based on perception and action of an autonomous and self-organized organism that produces meaning inside and outside itself (see in Herder the concept of narration and of cognition elaborated in *Erkenenn und Empfinden der menschlichen Seele*). The two poles of this dynamic process are the mental embodied activity of the subject and the environment; the latter is configured as a "domain of relations produced by the autonomous activity of the cognitive being and by the way it is coupled to its environment" (Colombetti and Thompson 85):

> [...] to say that cognition is embodied means that it arises from its embodied interactions with the environment. Starting from this perspective we can say that cognition depends on the type of experience resulting from having a body with specific perceptive and motor abilities, inseparably linked togheter, and that all together constitute the matrix within which the faculties of reason, memory, emotion, language and all the other faculties of mental life are woven. (Thelen *et al., Dynamics* 1).

c) *Enacted Mind - Cognition (in Herder: Erkennen und Empfinden / Cognition and Sensation, "Erkenntnis und Empfindung leben nur in Tat" / Cognition and sensation live only in action)*

In order to investigate the complex phenomenon of cognition, we need to consider the interaction between each individual brain-body system and that of others: "To make sense of cognition we need to study the brain, the body, their relationship with the world and with the brain-body systems of others" (Gallese, *Embodied* 31). Cognition is considered as a form of experience of the body in the world: knowledge is no longer understood only as representational, i.e. in the context of formal operations of abstract symbols, but as enaction (Thompson, *Mind*; *Empathy* 1-32; see also Noë, *Vision*), i.e. as an action generated within the organism in the process of its relation with the world, culminating in the creation of a complex system of actions, interactions and meanings. Perception, experience and cognition arise from the relations created between the mind, embodied in the whole organism, and the environment in which the body is located and with which it interacts. Therefore, a basic phenomenon, such as perception, does not occur

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passively: it is the result of an 'activity' that changes the status of the nervous system during the experience of the world (see Thompson and Noë for further discussion). In this perspective, cognition is to be understood as the action of the living organism in its interaction with the environment. Cognition appears therefore as an active phenomenon, distributed in the body, related to the neural and sensorimotor specificities of the subject, that is immersed in a wider biological context. Living itself is understood as a process of continuous cognition: "Living systems are cognitive systems and living is a process of cognition" (Maturana and Varela, *Autopoiesis* 59). The interaction of the subject with the environment is perceived actively and elaborated as lived experience, stored knowledge, emotions, memories (see in Herder: *Apperzeption*, *Bewußtsein/Apperception, Consciousness*). The cognitive reorganization of the lived experience induces a transformation of the organism and its autopoietic reorganization by means of enaction:

> Cognition no longer appears to be a problem-solving activity, carried out on the basis of representations; rather, it takes place as an enactment, namely through the development of a world in a possible narration by connecting structural meanings (Varela *et al., Embodied* 205).

This implies that all phenomena related to enaction, such as language, sociality and culture, depend on corporeity: "Cognition is based on the fact that we are in a world which is inseparable from our bodies, our language and our social history - in short, from our embodiment" (Varela *et al., Embodied* 149).

d) *Extended Mind (in Herder: Treatise on the Origin of Language, "Würkungskreis" / Circle of activities)*

Since the Nineties of the last century, the concept of the embodied mind was combined with that of the extended mind and used to indicate that mental processes do not reside only in the brain-body activity but they are extended to artifacts and social configurations modifying the mind-body skills and knowledge (see Newen *et al.* for further discussion). In the perspective of embodiment, language is regarded as the result of an interaction among organisms, while the wide field of cultural phenomena is considered as the result of a "transgenerational stability of behavioral configurations ontogenetically acquired within the dynamics of communication in a social environment" (Maturana and Varela, *Albero* 170). The 'simulative theory' of language, already hypothesized by Varela, has been recently scientifically confirmed: the linguistic activity is related to the activation of brain areas used for perception and movements (see Faschilli). The simulative mechanisms are obviously anchored in our corporeity (see Gallese and Lakoff), in a "model of bodily representation" (Cuccio *et al.* 70). When we read or listen to sentences that indicate actions, a process of simulation of those actions takes place in our brain, since language implies the activation of our motor system (Gallese and Cuccio 11). Therefore, Gallese concludes that "reading or listening to a sentence describing an action performed by a hand activates the motor representation of the same action" (Gallese and Cuccio 11). This motor activation can also take place in the case of abstract language or of a figurative use of language, as in case of metaphors: "The enaction of the simulation process in linguistic understanding suggests that the symbolic dimension and the body dimension co-exist in the linguistic practice" (Gallese and Cuccio 16). Not only the sensory and motor activations are fundamental to linguistic comprehension, but they are also active in the elaboration that language makes of aspects of our most complex bodily experience, both in terms of subjective experience and of its conceptualization. (GP)

III. Herder, the Precursor

Before investigating the specific issues of Herder's thought revealing him as a precursor of embodiment, it is necessary to briefly highlight Herder's knowledge in physiology and medicine. Herder's interest in the physiological and anatomical theories of the physician Franz Joseph Gall, considered together with Samuel Thomas von Sömmerring and Johann Christian Reil the founder of the neurological anatomy in Germany, is well known. As his wife Karoline put out in *Erinnerungen aus dem Leben Joh. Gottfrieds von Herder*: "[Herder] sehnte sich, diesen Mann [Gall] selbst zu sehen, und mit ihm über seine Bemerkungen und Schlüsse zu sprechen, da sie in die feinsten organischen Gesetze der menschlichen Natur einschlagen" [[Herder] longed to meet this man [Gall], and to talk to him about his remarks and conclusions, as they illuminate the finest organic laws of human nature] (Müller 109; see also Gall's works).

Herder took fundamental inspiration from Gall's works about the anatomy of the human body (Häfner 390), as well as from Johann Wilhelm Ritter's theories about the principles of galvanism and electricity, and from Abraham Gottlob Werner's ideas about geology. However, as Häfner points out (Häfner 390), the specific sources for the study of the physiology of the brain, which flow into his anthropology, cannot be specified, while his theories reveal the influence of the physiology of Albrecht von Haller (Häfner 394) and of Charles Bonnet, specifically in relation to the physiological bases of psychology. This is demonstrated also by the presence in his library of the following volumes: *Essai analytique, Considérations sur les corps organisés* (1762), *Contemplation de la Nature* (1764) and *Palingénésie philosophique* (1769) (see Häfner). The reception of texts by Bonnet highlighted by Häfner build up the premises for a theory of history understood as an

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expression of human action based on the dispositions of the corporeal organism.

More specifically, we will now see Herder's main contributions to the new definition of the paradigms of embodied mind and cognition, rooted in the principle of the interaction of bodies in the totality of the existing. In order to draw the parallels with the recent theories on embodiment clearer, we will proceed by indicating the references to the different core theories of *4E Cognition*, referring to their presentation in the previous paragraph:

a) *Commercium mentis et corporis, Nervengebäude / Nervous system, Reize / stimuli, Sinne / senses (Embodied Mind)*

The bodily dimension, which determines for Herder the definition of the human being as "*ανθρωπος ψυχικος*" (HW IV, 353), is crucial in his work *Vom Erkennen und Empfinden der menschlichen Seele*. Starting from the title, Herder puts sensory cognition, thought and emotion in relation, rooting them in corporeity, i.e. in what he defines the *Nervengebäude* [nervous system], understood as a physiological totality from which thought, will and spirit derive, and which are constantly interacting with the surrounding world:

> […] das Nervengebäude […] dadurch der Schöpfer die innere und äußere Welt, und in uns Herz und Kopf, Denken und Wollen, Sinne und alle Glieder knüpfet. Würklich ein solches Medium der Empfindung für den geistigen Menschen, als es das Licht fürs Auge, der Schall fürs Ohr von außen sein konnte.
>
> [[...] the nervous system [...] through which the creator builds both the inner and outer world, and within us heart and head, thought and will, senses and all bodily parts. This is a remarkable medium of sensations for the human being, as it is the light for the eye, the sound for the ear.] (HW IV, 351).

Sensory perception is conveyed by stimuli called "*Reize*" [stimuli] and occurs through the senses, which are therefore understood as instrument of thought, just as in the current concept introduced by Varela (see paragraph: Embodied mind): "[...] ohne Körper ist unsre Seele im Gebrauch nichts: mit gelähmten Sinnen ist sie selbst gelähmt [...]" [[...] without a body our soul is nothing: with paralysed senses it is paralysed itself [...]] (HW IX/2, 120).

For Herder there is a circularity among outer world (*Welt*), brain (*Hirn*), heart (*Herz*), from which image and passions originate. The senses, from which images and sounds of the world derive, are pervaded by a force that unifies everything, postulating an absence of ontological difference between biological and mental functions. This force is defined by Herder as "Äther" [ether]: this principle is not external to the body, but has the same nature, which gives rise to the creation of thought, starting from a stimulus that can be internal or external to the body:

> Wir empfinden nur, was unsre Nerven uns geben; darnach und daraus können wir auch nur denken. Nenne man nun diesen lebendigen Geist, der uns durchwallet, Flamme oder Äther; genug, er ist das unbegreifliche himmlische Wesen, das Alles zu mir bringt und in mir einet. Was hat der Gegenstand, den ich sehe, mit meinem Hirn, das Hirn mit meinem wallenden Herzen gemein, daß jenes Bild, daß dies Leidenschaft werde? Siehe da ist ein Etwas, das von sonderbarer Natur sein muß, weil es so sonderbaren Verschiedenheiten dienet. Das Licht konnte nur Eins, den ganzen dunkeln Abgrund der Welt zum Bilde machen, dem Auge alles veräugen: der Schall konnte nur Eins, hörbar machen, was sonst nur für andre Sinne da wäre. So weiter. Dieser innere Äther muß nicht Licht, Schall, Duft sein, aber er muß alles empfangen und in sich verwandeln können. Er kann dem Kopfe Licht, dem Herzen Reiz werden: er muß also ihrer Natur sein, oder zunächst an sie grenzen. Ein Gedanke, und Flammenstrom gießt sich vom Kopf zum Herzen. Ein Reiz, eine Empfindung und es blitzt Gedanke, es wird Wille, Entwurf, Tat, Handlung: alles durch Einen und denselben Boten.
>
> [We only feel what our nerves give us; we can only think about them and from them. Let us call this living spirit that wanders through us flame or ether; well, it is the incomprehensible ethereal being that brings everything to me and unites it within me. What does the object I see have in common with my brain, the brain with my flowing heart, that becomes image and passion? Behold, there is something which must be of a strange nature, because it serves such strange diversities. The light could only make one thing, bring the whole dark abyss of the world into an image, taking it to the eye; the sound could only make one thing audible, which otherwise would only be there for other senses. And so on. This inner ether does not have to be light, sound, fragrance, but it must be able to receive everything and transform it into itself. It can become light to the head, a stimulus to the heart: it must be their nature or must first border on it. One thought, and a stream of flames pours from the head to the heart. A stimulus, a sensation and it becomes thought, will, design, action, deed: all through one and the same medium.] (HW IV, 352).

Carring out his reflection through the technique of paradox and referring to the studies conducted at the time by Diderot and others concerning blind individuals, Herder bases the whole philosophy on the physiology of the body: a blind person would have an excellent philosophical mind, since the other senses would be heightened by the lack of sight. Such a deprivation would lead to a strengthening of bodily perception and to a healthy and powerful philosophical thought because it would be nourished not by abstraction, but by sensory concreteness:

> Hier würde eine Physiologie der Seele und des Körpers kommen, die wir noch nicht haben. Er [der Blinde] würde sagen, was das ist: ich denke und fühle: ich denke und höre! Hier würde in diesen drei Begriffen die ganze Metaphysik von Raum, Zeit und Kraft liegen:

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> **Kraft**: ich denke; darum würke ich ins Universum darum bin ich Körper
>
> **Raum**: ich fühle: d.i. ich denke in einer eingeschränkten Sphäre
>
> **Zeit**: ich höre: d.i. ich denke Eins nach Eins!
>
> [Here would rise a physiology of the soul and the body that we do not yet have. He [the blind man] would say what that is: I think and feel: I think and hear! Here, in these three terms, lies the whole metaphysics of space, time and force:
>
> **Force**: I think; that is why I am dwelling in the universe; that is why I am body
>
> **Space**: I feel: i.e. I think in a restricted sphere
>
> **Time**: I hear: i.e. I think one after the other!] (Herder, *Sinn* 235-242).

The problem of the confluence of sensory data in perception and of specific cognitive qualities of sight and touch are also discussed in his famous essay *Plastik* (written between 1769 and 1770 and published in Riga in 1778). Herder identifies the specific properties of each sense and, at the same time, affirms the need to study the collaboration established by the senses in the elaboration of concepts and therefore of knowledge. Starting from the wide theoretical panorama of empirical sensualism, Herder is clearly against the assumptions formulated by Descartes, and assigns a cognitive and at the same time normative value to *aisthesis*, namely the sensitive world made up of human beings in flesh and blood:

> Jeder Gegenstand zeigt mir gerade so viel von sich, als der Spiegel von mir selbst zeigt, das ist, Figur, Vorderseite; daß ich mehr bin, muß ich durch andre Sinne erkennen, oder aus Ideen schließen.
>
> [Each object shows me just as much of itself as the mirror shows of myself, that is, figure, forefront; that I am more, I must recognize through other senses, or infer from ideas.] (HW IV, 249).

Therefore, concepts are an elaboration made by the body, which uses the senses starting from childhood:

> Nur da wir von Kindheit auf unsre Sinne in Gemeinschaft und Verbindung brauchen: so verschlingen und gatten sich alle, insonderheit der gründlichste und der deutlichste der Sinne, Gefühl und Gesicht. Die schweren Begriffe, die wir uns langsam und mit Mühe ertappen, werden von Ideen des Gesichts begleitet: dies klärt uns auf, was wir dort nur dunkel faßten, und so wird uns endlich geläufig, das mit einem Blick weg zu haben, was wir uns Anfangs langsam ertasten mußten. Als der Körper unsrer Hand vorkam, ward zugleich das Bild desselben in unser Auge geworfen: die Seele verband beide, und die Idee des schnellen Sehens läuft nachher dem Begriff des langsamen Tastens vor.
>
> [It is only because from childhood on we need our senses to be in communion and connection: in this way all of them intertwine and interweave, in particular the most thorough and clearest of the senses, feelings and expressions. The difficult concepts which we slowly and laboriously catch up with are accompanied by ideas of the vision: this clears up what we only grasped darkly there, and so we finally get used to having away with a glance what we had to feel slowly at first. When the body appears in our hand, the image of it is also cast into our eyes: the soul connects the two, and the idea of fast vision is later replaced by the concept of slow touch.] (HW IV, 251).

The body thus becomes a real cognitive organ and a measuring instrument of the world:

> Da alle unsre Begriffe vom Menschen ausgehen oder auf ihn kommen: so muß nahe diesem Mittelpunkt und der Art, wie er spinnt und würkt, die Quelle der größten Irrtümer und der sichtlichsten Wahrheit aufgespürt werden, oder sie ist nirgend.
>
> [Since all our concepts start from human beings or come to them, the source of the greatest errors and the most visible truth must be sought out near this point and in the way he works and spins, or it will be found nowhere.] (HW IV, 253).

Also, the act of reception would follow the same process of 'simulating' the cooperation of the other senses besides sight and completing the visual data with those obtained from memory, which can be linked to the experience of form and space, perceived by the body:

> Seht jenen Liebhaber, der tiefgesenkt um die Bildsäule wanket. Was tut er nicht, um sein Gesicht zum Gefühl zu machen, zu schauen als ob er im Dunkeln taste? Er gleitet umher, sucht Ruhe und findet keine, hat keinen Gesichtspunkt, wie beim Gemälde, weil tausende ihm nicht gnug sind, weil, so bald es ein gewurzelter Gesichtspunkt ist, das Lebendige Tafel wird, und die schöne runde Gestalt sich in ein erbärmliches Vieleck zerstückelt. Darum gleitet er: sein Auge ward Hand, der Lichtstrahl Finger, oder vielmehr seine Seele hat einen noch viel feineren Finger als Hand und Lichtstrahl ist, das Bild aus des Urhebers Arm und Seele in sich zu fassen.
>
> [Look at that lover, who swings deeply around the statue. What does he not to turn his vision into a feeling, to look as if he is tasting in the dark? He glides around, seeks rest and finds none, has no point of view, as in the painting, because thousands are not enough for him, because, as soon as he gets a rooted point of view, the Image of the Living appears, and the beautiful round figure fragments into a pitiful polygon. Therefore, he glides: his eye became a hand, the ray of light a finger, or rather his soul has a much finer finger than hand and ray of light do have, in order to contain within itself the image of the author's arm and soul.] (HW IV, 255).

The body intended as a unitary sensory organ 'reflects within itself', embodying what is perceived outside, and storing such data in a memorial fluxus, functional to every new cognitive process:

> Jede Empfindung in der Jugendseele ist nicht bloß was sie ist, Materie, sondern auch aufs ganze Leben Materie: sie wird nachher immer verarbeitet, und also gute Organisation, viele, starke, lebhafte, getreue, eigne Sensationen, auf die dem Menschen eigenste Art sind die

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> Basis zu einer Reihe von vielen starken, lebhaften, getreuen, eignen Gedanken, und das ist das Original Genie […]
>
> [Every sensation in the young soul is not only what it is, matter, but also a lifelong matter: it is processed again and again and therefore all good organisations, many strong, lively, faithful, own sensations, in the most own way, are the basis for a series of many strong, lively, faithful, own thoughts, and that is the original genius [...]] (HW IX/2, 121).

Conceptualization is therefore considered as the result of the elaboration of sensorial perception which, through the action of memory and its subsequent elaborations, becomes language, personal and cultural heritage which in turn gives rise to the perceived and transmitted reality:

> Durch Repräsentation der Sachen fürs Gesicht, noch mehr aber Gefühl: durch Körperliche Übungen und Erfahrungen allerlei Art, durch Bedürfnisse und Ersättigungen, wie sie nur sein können. Alles versteht sich pro positu, in welcher Art von Welt man lebt, und sehen kann.
>
> [By representing things for the vision, but even more for touch: through physical exercises and experiences of all kind, through any needs and satisfactions, everything is understood pro positu, in whatever kind of world one lives and can see.] (HW IX/2, 122).

Thought finds thus its articulation in narration, which connects or contrasts data, emotions and memories in a sequence that fills the human mind like a continuous flow:

> Der gewöhnliche Lauf unsrer Gedanken geht so schnell; die Wellen unsrer Empfindungen rauschen so dunkel in einander: es ist auf einmal so viel in unsrer Seele, daß wir in Absicht der meisten Ideen wie im Schlummer an einer Wasserquelle sind, wo wir freilich noch das Rauschen jeder Welle hören, aber so dunkel, daß uns endlich der Schlaf alles merkbare Gefühl nimmt. Wäre es möglich, daß wir die Kette unsrer Gedanken anhalten, und an jedem Gliede seine Verbindung suchen könnten - welche Sonderbarkeiten! welche fremden Analogien der verschiedensten Sinne, nach denen doch die Seele geläufig handelt!
>
> [The ordinary course of our thoughts goes so fast; the waves of our sensations rush so darkly into each other: there is so much in our souls all at once as if we were asleep at a water spring, where we can still hear the sound of each wave, but the sleep finally takes away all noticeable feelings. Would it be possible that we could stop the chain of our thoughts and seek its connection at every part of the body - what peculiarity! what strange analogies of the most diverse senses, according to which the soul usually acts] (HW I, 745).

b) Analogon, unity of the existing (Embedded Mind)

At the basis of Herder's embodied theorization is the principle of the *Analogon* (see Irmscher, Verra, Löchte and Simon for detailed studies), a complex concept which links the embodied theory of cognition with that of aesthetic reception, which is as well rooted in sensory perception, as highlighted by Hans Adler in the essay *Was ist vergleichen bei Herder*, to be found in Allert's book (Allert 22-37). *Analogon*, which appears at the beginning of the treatise *Vom Erkennen und Empfinden der menschlichen Seele*, in the *Erster Versuch* entitled *Vom Erkennen und Empfinden in ihrem Ursprunge und den Gesetzen ihrer Würkung. Bemerkungen und Träume*, is defined as follows: "[...] *Analogie*, das Gefühl von dem Einen, der in aller Mannigfaltigkeit herrschet [...]" [the feeling of the one who prevails in all diversity]"; "[...] der empfindende Mensch fühlt sich in Alles, fühlt Alles aus sich heraus, und druckt darauf sein Bild, sein Gepräge" [the sentient person feels in everything, feels everything out of himself, and prints his image, his impression on it)" (HW IV, 331). More specifically, the principle of *Analogon* appears as a mental image, or rather, in cognitive terms, an *image schema*, from which one may proceed in the elaboration of perceptions in narrative sequences:

> Der Mensch ist ein Inbegrif der ganzen Welt, der sichtbaren u. unsichtbaren, selbst Gottes. Er könnte von keiner Eigenschaft Geistes u. Körpers im Universum einen Begrif, noch weniger ein Gefühl haben, wenn er nicht ein Analogon davon in sich besäße.
>
> [Man stands for the whole world, the visible and invisible, even for God. He would have no idea, much less a feeling of any quality of spirit or body in the universe, without bearing an *Analogon* within himself.] (Herder, *Brief* 1034).

Herder's concept of *Analogon* has a physical nature, since it originates from the *Reiz* [stimulus], which moves from a "*schlagendes Herz*" [beating heart] and crosses a "*feines Faserngewebe*" [fine fibre fabric] that pervades the body, reaching the nervous system. Herder draws these principles from Bonnet's *Essai de psychologie* and Robert Boyle's *Korpuskularlehre* (Häfner 398). He further adopts these concepts to theorize the existence of man as "whole man", or as sensorium of the whole universe, moving the focus from the dimension of the human being as "*sensorium numinis*" to the purely anthropological dimension of corporeity understood as the origin of all phenomena. As we read in the *Paralipomena* to the essay *Plastik*: "Unser Körper ist nur ein Bild unsrer Seele (ανθρ ⟨ωπος Ψυχ ⟨ικος⟩) u. diese nur der Keim zum *Geist* (πν ⟨ευμα⟩) der aus ihm erwachsen u. sein Wesentlichstes überkleiden soll" (Our body is only an image of our soul (ανθρ ⟨ωπος Ψυχ ⟨ικος⟩) and this is only the germ of the spirit (ν ⟨ευμα⟩) which should grow out of it and cover its most essential parts] (Häfner 398).

On the one hand, the concept of the body intended as *sensorium* of the world and image of the world's soul postulates the principle of identification of the microcosm with the macrocosm; on the other hand, it attests the premises for a mirroring effect, which is not merely metaphorical, but mainly physical: "Wie unsere

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ganze Psychologie aus Bildwörtern besteht, so war es meistens ein neues Bild, eine Analogie, ein auffallendes Gleichnis, das die größten und kühnsten Theorien geboren hat. [...] Was wir wissen, wissen wir nur aus Analogie, von der Kreatur zu uns und von uns zum Schöpfer." [As all our psychology is made up by pictorial words, it was usually a new image, an analogy, a striking simile that gave birth to the greatest and most daring theories. [...] What we know, we know only by analogy, from the creature to us and from us to the Creator.] (HW IV, 331).

What defines *Analogon* is the sharing of the common laws of nature through corporeity, an assumption that allows Herder to create an 'ecological' vision of life, in which the same vital laws of other forms of life in nature are at work in the human being, as it is extensively expounded in *Ideen zur Philosophie der Geschichte der Menschheit* (1784-1791):

> Unter der Erde fängt diese Vielartigkeit an und sie wächst hinauf durch Pflanzen, Tiere, bis zum vielartigsten Geschöpf, dem Menschen. Sein Blut und seine vielnamigen Bestandteile sind ein Kompendium der Welt: Kalk und Erde, Salze und Säuren, Öl und Wasser, Kräfte der Vegetation, der Reize, der Empfindungen sind in ihm organisch vereint und in einander verwebet.
>
> [This diversity begins under the earth, and it continues to grow through plants, animals and even the most diverse creature, the human being. His blood and his many named components are a compendium of the world: lime and earth, salts and acids, oil and water, the forces of vegetation, stimuli and sensations are organically united and interwoven in him.] (HW IV, 168).

According to Herder, the active principle of perception is identified in the "*Reiz*" [stimulus], defined as "die Triebfeder unsres Daseins" [the driving force of our existence], corresponding in nature to the laws of excitation, expansion and contraction, from which derives the contrast between hot and cold:

> Was in der toten Natur Ausbreitung und Zurückziehung, Wärme und Kälte ist: das scheinen hier diese dunklen Stamina des Reizes zur Empfindung: eine Ebbe und Flut, in der sich, wie das Weltall, so die ganze empfindende Natur der Menschen, Tiere, und wo sie sich weiter hinab erstrecke, bewegt und reget.
>
> [Similar to what in inert nature are expansion and retreat, warmth and cold, is the dark stamina of attraction for our senses: an ebb and flow, in which, like the universe, the whole sentient nature of people, animals, and where it extends further down, moves and stirs.] (HW IV, 334).

Herder identifies the vital organic principle of the existing (the spirit) in the process of breathing, which along several stages of complexity leads to an exchange between the body and the environment. This happens in progressive levels of complexity in plants as well as in animals and in human beings. This issue is not to be understood in a theological way, but as the 'selbst innigste, würkendste Kraft [der Natur]' [the most intimate, active power [of nature]] (HW IV, 339). As a result, Herder postulates the unity of body, mind and spirit, as rooted in the organicity of all the existing beings, and reflected at best in the human being:

> Der innere Mensch mit all seinen dunklen Kräften, Reizen und Trieben ist nur Einer. Alle Leidenschaften, ums Herz gelagert, und mancherlei Werkzeuge regend, hängen durch unsichtbare Bände zusammen und schlagen Wurzel im feinsten Bau unsrer beseelten Fibern. Jedes Fäserchen, wenn wirs einsehen könnten, gehört ohne Zweifel mit dazu, jedes engere und weitere Gefäß, jede stärker und schwächer wallende Blutkugel.
>
> [The inner nature of the human being with all his dark powers, stimuli and drives is only one. All passions stored around the heart, and some stirring tools are tied together by invisible bonds and take root in the finest structure of our soulful fibres. Every little fibre, if we could see it, is without doubt part of it, every narrow and wider vessel, every ball of blood flowing stronger and weaker.] (HW IV, 339).

Central categories around which the unity of existence is hinged are "*Elastizität*" [elasticity], "*Reizbarkeit*" [irritability] and "*Sinnlichkeit*" [sensuality], which Herder probably borrowed from Haller (Barr Nisbet 256). The principle of *Elastizität* appears in the first lines of *Vom Erkennen und Empfinden der menschlichen Seele* and is explained in terms of a force that gives movement and action to the whole – "der erste scheinbare Funke zur Tätigkeit in edlen Naturen" [the first apparent spark of activity in noble natures] giving impulse to the manifestation of the "Seele der Welt" [soul of the world], the "allgegenwertiger Lebensgeist" [omnipresent spirit of life], the two main opposing forces of attraction and repulsion, present in the "elektrischer Strom" [electrical storm] (HW IV, 330): "Überhaupt ist in der Natur nichts geschieden, alles fließt durch unmerkliche Übergänge auf- und ineinander; und gewiß, was Leben in der Schöpfung ist, ist in allen Gestalten, Formen und Kanälen nur Ein Geist, Eine Flamme. [In nature, nothing is separate, everything flows through imperceptible transitions to and into each other; and certainly, what is life in creation exists in all forms, shapes and channels only as one spirit and one flame.] (HW IV, 335).

c) Erkennen und Empfinden (Enacted Mind - Cognition)

"Erkenntnis und Empfindung leben nur in *Tat* (Knowledge and sensation live only in action)" (HW IV, 376). This strong and unequivocal assumption postulates not only the co-participation of the emotional dimension in the cognitive act, but also the centrality of action in the gnoseological process, as already proposed by Bonnet in the triad "*Empfinden - Denken – Handeln*" [Feel - Think – Act] (Häfner 406). The core of this revolutionary concept of cognition is the codetermination between cognitive and emotional processes, according to which "unsre Empfindungen,

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Glieder und Triebe [...] einander binden, anregen und stärken [our sensations, limbs and drives [...] are bound, stimulate and strengthen each other)" (HW IV, 352). It is therefore not surprising that the first paragraph of the second part of *Vom Erkennen und Empfinden der menschlichen Seele* is apodictically entitled as follows: "Unser Denken hängt ab vom Empfinden" [Our thinking depends on feeling] (HW IV, 366). The codetermination of thought and emotion, not univocally placed in the philosophical thought of his time (see Sauder and Vila for a detailed study), emerges in Herder with strength, both at the level of the human action and at that of the determinations of entire nations: "Wie *einzelne Menschen*, so sind noch mehr *Familien und Völker* von einander verschieden: nach dem Kreise ihrer Empfindungs- richtet sich auch ihre Denkart" [Like *single individuals*, even *families and peoples* are different from each other: their way of thinking depends on the circle of their way of feeling and thinking)". (HW IV, 369).

Emotion, on an individual level, is described by Herder as one of the main interacting sources in the process of perception and knowledge of the world:

> Oft liegen unter dem Zwergfell Ursachen, die wir sehr unrichtig und mühsam im Kopf suchen; der Gedanke kann dahin nicht kommen, wenn nicht die Empfindung vorher an ihrem Ort war. Wie fern wir an dem, was uns umgibt, Teil nehmen, wie tief Liebe und Haß, Ekel und Abscheu, Verdruß und Wollust ihre Wurzeln in uns schlagen; das stimmt das Saitenspiel unsrer Gedanken, das macht uns zu denen Menschen, die wir sind.
>
> [Often there are causes under the diaphragm which we search for very incorrectly and laboriously in our head; the thought cannot come to that place if the sensation has not been there before. How far we take part to what surrounds us, how deeply love and hate, disgust and loathing, annoyance and lust take their roots in us; this is what makes us the people we are.] (HW IV, 340-341).

The nature of human emotions is not distinct from the physical nature of bodies, although it manifests itself through different forces, namely those of electrical irritability, capable of animating matter, as Herder himself states, a principle derived from Haller's theory. In the same way that Haller had identified in the "*Reiz*" [stimulus] both external stimuli and internal stimuli, Herder sees in the stimulus the strenght that pervades the organic nature:

> Hat man je etwas Wunderbarers gesehen als ein schlagendes Herz mit seinen unerschöpflichen Reizen? Ein Abgrund innerer dunkeln Kräfte, das wahre Bild der organischen Allmacht, die vielleicht inniger ist, als der Schwung der Sonnen und Erden. Und nun breitet sich aus diesem unerschöpflichen Brunnen und Abgrunde der Reiz durch unser ganzes Ich aus, belebt jede kleine spielende Fiber - alles nach Einartigen einfachen Gesetzen.
>
> [Have you ever seen anything more wonderful than a beating heart with its inexhaustible stimuli? An abyss of inner dark forces, the true image of organic omnipotence, which is perhaps more intimate than the swing of the sun and earth. And now, from this inexhaustible well and abyss, the stimulus spreads through our whole self, enlivens every little playing fibre – all according to such simple laws.] (HW IV, 333).

Compared to the theory of affections of his epoch, Herder had a brilliant intuition on the relationship between body and emotions, only recently acquired by science (see Caruana and Viola for further discussion), specifically from the studies of the neuroscientist Damasio: in this new perspective, diverging from other orientations in affective science and in the philosophy of emotions, emotion is not considered as an immaterial feeling, but as a consequence of a reaction of the body, of chemical and neural nature, i.e. a somatic alteration determined by a specific situation perceived by the limbic brain and transmitted to the somato-sensory cortex, which in turn forms a representation of the modification of bodily schemes. For example, when facing an event perceived by the limbic brain as a danger, heartbeat and sweating increase: these are somatic phenomena which have a motivational effectiveness (fleeing from possible danger) and which we perceive as fear on the level of the phenomenological experience. Herder describes this process as follows:

> Wenn wir uns wohl befinden, ist unsre Brust weit, das Herz schlägt gesund, jede Fiber verrichtet ihr Amt im Spiele. Da fährt Schrecken auf uns zu; und siehe als erste Bewegung, noch ohne Gedanken von Furcht und Widerstande, tritt unser reizbares ich auf seinen Mittelpunkt zurück, das Blut zum Herzen, die Fiber, selbst das Haar, starrt empor; gleichsam ein organischer Bote zur Gegenwehr, die Wache steht fertig.
>
> [When we are well, our chest is wide, the heart beats healthy, every fibre does its job. Then horror comes upon us; and behold, as the first movement, still without thoughts of fear and resistance, our irritable self steps back to its centre, the blood to the heart, the fibre, even the hair, stares up; as it were an organic messenger to fight back, the guard stands ready.] (HW IV, 333).

The inner dimension of the human being is inseparable from the corporeal one:

> Meines geringen Erachtens ist keine Psychologie, die nicht in jedem Schritte bestimmte Physiologie sei, möglich. Hallers physiologisches Werk zur Psychologie erhoben und wie Pygmalions Statue mit Geist belebet - als denn können wir etwas übers Denken und Empfinden sagen.
>
> In my opinion, no psychology that is not specific physiology is possible. Haller's physiological work elevated to psychology and, like Pygmalion's statue, enlivened with spirit – as if we could say something about thinking and feeling. (HW IV, 341).

In the soul, thought and emotion coincide, drawing strength from the body and from the vital nutrients processed from food. In opposition to Leibniz' vision put out in the *Monadologie*, Herder's idea is that

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the soul does not produce content from the inside, but from the body and the environment, with which it is related through an analogical relationship:

> […] menschliche Seele […]. Ihr Denken wird nur aus Empfindung: ihre Diener und Engel, Luft- und Flammenboten strömen ihr ihre Speise zu, so wie diese nur in ihrem Willen leben. […] Ich kann mir überhaupt nicht denken, wie meine Seele etwas aus sich spinne und aus sich eine Welt träume? ja nicht einmal denken, wie sie etwas außer sich empfinde, wovon kein Analogon in ihr und ihrem Körper sei. Wäre in diesem Körper kein Licht, kein Schall: so hätten wir auf aller weiten Welt von nichts, was Schall und Licht ist, Empfindung: und wäre in ihr selbst, oder um sie, nichts dem Schall, dem Licht Analoges, noch wäre kein Begriff dessen möglich.
>
> [[...] human soul [...]. Its thinking comes only from sensation: its servants and angels, messengers of air and flames stream their food to it, just as these only live in its will. [...] I cannot imagine, how my soul could spin something out of itself and dream a world out of itself. I cannot even imagine, how it feels something out of itself, of which there is no analogue in it and in the body. If there were no light, no sound in this body, we would have no sensation in the whole wide world of what is sound and light: and if there were nothing analogous to sound or light in her, or around her, no concept of it would be possible.] (HW IV, 354).

The concept of soul loses all its immateriality, since it emerges from nature, i.e. from the univocal substance of the whole living:

> Aber so wäre ja die Seele materiell? oder wir hätten gar viele immaterielle Seelen? So weit sind wir noch nicht, mein Leser; ich weiß noch nicht, was Material oder Immaterial sei? glaube aber nicht, daß die Natur zwischen beiden eiserne Bretter befestigt habe, weil ich die eisernen Bretter in der Natur nirgend sehe und gewiß da am wenigsten vermuten kann, wo die Natur so innig vereinte.
>
> [So, the soul would be material? Or would we even have many immaterial souls? We have not yet reached that point, my reader; Do I know yet what material or immaterial is? I don't think that nature has fixed iron planks between the two, because I see the no iron planks in nature, and I can certainly least suspect their presence where nature has been so intimately united.] (HW IV, 355).

The concept of soul does not imply a salvific metaphysics in religious terms, but remains strongly anchored within the natural dimension of vital forces resulting from the interaction of energy, thought and emotion:

> Ist Seele das, was wir fühlen, wovon alle Völker und Menschen wissen, was auch der Name sagt, das nämlich, was uns beseelt, Urgrund und Summe unsrer Gedanken, Empfindungen und Kräfte: so ist von ihrer Unsterblichkeit aus ihr selbst keine Demonstration möglich.
>
> [If the soul is what we feel, what all peoples know, what its name says, that is, what animates us, the source and sum of our thoughts, feelings and powers, then no demonstration of its immortality is possible.] (HW IV, 394).

Herder's perspective links the evolution of the individual soul to that of the social body, which, like the former, can develop in a process of growth and improvement, according to a project that leads from the individual *Bildung* [education] to that of mankind, and finally to the realization of the highest potential of humanity, as masterfully summarized by Schmidt-Biggemann:

> […] die Seele sieht sich und wird gesehen im Prozeß der Selbstveränderung und Verbesserung zur Empfindungseinheit, einem Prozeß, der für den einzelnen Menschen emphatisch Bildung, für seine Gattung Erziehung zur Humanität heißt.
>
> Erziehungsziel für den Einzelnen und fürs Menschengeschlecht ist Humanität, der Status des verwirklichten ganzen Menschen. […] Der Gedanke bürgerlicher Erziehung wird […] theologisch-philosophisch als Erziehung des Menschengeschlechts zur Autonomie überhaupt, die die Natur des Menschen am Menschen vollzog.
>
> [[…] the soul sees itself and is seen in the process of self-transformation and improvement to a unity of feeling, a process which for the individual person is emphatically called education, for his species education to humanity.
>
> The educational goal for the individual and for the human race is humanity, the status of the realised whole human being. [...] The idea of civic education evolves [...] theologically and philosophically as the education of the human race to autonomy, which the nature of the human being carried out on the human being.] (Schmidt-Biggemann, *Einführung,* in Schings 12).

Divine and human are combined by projecting the individual soul and the whole community into a unitary scheme, which overcomes the limit and opacity of matter, enhancing cognitive faculties through individual and collective *Bildung* [education], and reaching a higher and more evoluted level of humanity. This idea brings together the physiological, ethical and political discourse in one cognitive project that joins the individual and the collective evolution. The medium for that is the new concept of aesthetics, understood as a process that leads from the senses to a continuous act of construction of meaning and of *Bildung*, intended as the true *modus operandi* of human kind at the level of culture. Herder contrasts an abstract concept of aesthetics with one that is extremely related to the sensory perception in *Über Bild, Dichtung und Sprache*: here he defines aesthetics as the "Philosophie der sinnlichen Empfindungen" [philosophy of sensual feelings], which summarises "[…] sowohl den Umfang seiner Gegenstände, als das Subjekt ihrer Wirkung […]. Eine Philosophie des *Geschmacks*, des *Schönen* u.f., die nur von Einem Sinne ausginge, müßte zur Philosophie der gesamten Empfindungen notwendig nur unvollkommene Bruchstücke liefern." [[...] both the

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scope of its objects and the subject of its effects [...]. A philosophy of taste, beauty, etc., which would emanate from only one sense, would have to provide only imperfect fragments for the philosophy of all sensations.] (HW IV, 635).

d) *Theory on the origin of language, "Würkungskreis /circle of activity (Extended Mind)*

> Nur die Sprache hat den Menschen menschlich gemacht, indem sie die ungeheure Flut seiner Affekten in Dämme einschloß und ihr durch Worte vernünftige Denkmäler setzte.
>
> [Only language made man human, by damming up the immense flood of his affects, and by giving him reasonable monuments through words.] (HW VI, 347).

This Herder's idea in *Ideen zur Philosophie der Geschichte der Menschheit* of 1791, further developing the reflections of his theory of language formulated in the famous *Abhandlung über den Ursprung der Sprache* (1772), a work for which he received the prize from the *Akademie der Wissenschaften* in Berlin (see Aarsleff and Derrida regarding the debate on language).

A premise adopted by Herder regarding the origin of language is the concept of 'necessity', of *'unmittelbares Naturgesetz'* [immediate natural law] (HW I, 747), which dominates every living being endowed with senses and acting as an *'empfindende Maschine'* [sentient machine)] (HW I, 747):

> Hier ist ein empfindsames Wesen, das keine seiner lebhaften Empfindungen in sich einschließen kann; das im ersten überraschenden Augenblick, selbst ohne Willkür und Absicht, jede in Laut äußern muß. Das war gleichsam der letzte, mütterliche Druck der bildenden Hand der Natur, daß sie allen das Gesetz auf die Welt mitgab: 'Empfinde nicht für dich allein: sondern dein Gefühl töne!'
>
> A sentient being cannot contain any of his lively sensations; in the first surprising moment, even without arbitrariness or intention, he must express each one in sound. To give everyone the law of the world was the last maternal gift of nature's creative hand: 'Do not feel for yourself alone but let your feeling sound!'. (HW I, 699).

Unlike Rousseau's and Condillac's theories, Herder's concept of sensitivity implyes expression (*enaction*). Language is not understood as a world of signs, but as the expression of sensations and emotions; therefore, it is indicated as "*Tiersprache*" [animal language], a substratum common to all sensitive beings. However, if its origin is to be found in the sensitive nature of the body, its *raison d'être* is the awareness of belonging to a *biosphere* in which we are not "*abgesonderte Steinfelsen*" [separate stone cliffs] or "*egoistische Monaden*" [selfish monads], but individuals belonging to the same sensitive existence: "Deine Empfindung töne deinem Geschlecht einartig und werde also von allen wie von einem mitfühlend vernommen!" [Your sensation is unique to your sex and is heard by all as if by one!] (HW I, 699).

In Herder's opinion, the ability to transmit sensations and emotions is not due to a divine gift, but to the common biological substance of all sensitive bodies (*extended mind*):

> Zartbesaitet, aber die Natur hat in diese Saiten Töne verborgen, die, gereitzt und ermuntert, wieder andre gleichzart gebaute Geschöpfe wecken, und wie durch eine unsichtbare Kette, einem entfernten Herzen Funken mitteilen können, für dies ungesehene Geschöpf zu fühlen - Diese Seufzer, diese Töne sind Sprache. Es gibt also eine Sprache der Empfindung, die unmittelbares Naturgesetz ist.
>
> [Softly stringed, nature has hidden in these strings sounds which, when solicited and encouraged, can awaken other equally softly built creatures, and as if, through an invisible chain, can send sparks to a distant heart to feel for this unseen creature:: These sighs, these sounds are language. So, there is a language of feelings which is an immediate natural law.] (HW I, 699).

According to Herder, the need to express with sounds or gestures one's own emotional state derived from the senses is not a human peculiarity, but a "mirror" property of the bodies that humans share with all sensitive being:

> Je harmonischer das empfindsame Saitenspiel selbst bei Tieren mit andern Tieren gewebt ist: desto mehr fühlen selbst diese miteinander; ihre Nerven kommen in eine gleichmäßige Spannung, ihre Seele in einen gleichmäßigen Ton, sie leiden würklich mechanisch mit.
>
> [The more harmoniously the sensitive play of the strings is woven with other animals, the more even these animals feel with each other; their nerves come into an equal tension, their soul into an equal tone, they suffer mechanically.] (HW I, 705-6).

Starting from the common sensitive substratum, Herder proceeds in identifying the peculiarities of human language, according to the principle of differentiation of what he calls "*Würkungskreis*", i.e. the context within which the organism acts and interacts:

> Jedes Tier hat seinen Kreis, in den es von der Geburt an gehört, […] je schärfer die Sinne der Tiere, je wunderbarer ihre Kunstwerke sind, desto kleiner ist ihr Kreis: desto einartiger ist ihr Kunstwerk. […] ich finde überall eine wunderbare beobachtete umgekehrte Proportion zwischen der mindern Extension ihrer Bewegungen, Elemente, Nahrung, Erhaltung, Paarung, Erziehung, Gesellschaft und ihren Trieben und Künsten.
>
> [Every animal has its circle, into which it belongs from birth, [...] the sharper the senses of the animals, the more wonderful their works of art are, the smaller their circle is and the more unique their work of art is. [...] I find everywhere a wonderful observed inverse proportion between the reduced extension of their movements, elements, food, preservation, mating, education, society and their drives and art products.] (HW I, 713).

A deep linkage connects the amazing creation of human language, words, concepts and judgements

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allowing not only the communication of individual messages, but of entire fictional worlds, to action:

> *'Die Empfindsamkeit, Fähigkeiten und Kunsttriebe der Tiere nehmen an Stärke und Intensität zu, im umgekehrten Verhältnisse der Größe und Mannigfaltigkeit ihres Würkungskreises'.* Nun aber -
>
> *Der Mensch hat keine so einförmige und enge Sphäre*, wo nur Eine Arbeit auf ihn warte*: mithin kein Kunsttrieb, keine Kunstfertigkeit* – und, das eine gehört hier näher her, keine Tiersprache. (HW I, 714).
>
> Seine Sinne und Organisation sind nicht auf eins geschärft: er hat Sinne für alles und natürlich also für jedes einzelne schwächere und stumpfere Sinne.
>
> ['*The sensitivity, abilities and artistic drives of animals increase in strength and intensity, in inverse proportion to the size and diversity of their circle of action'.*
>
> But now -
>
> *The human being does not have such a uniform and narrow sphere*, where only one work awaits him*: thus no artistic instinct, no artistry* – and, one thing belongs here closer, no animal language.
>
> His senses and organisation are not focused on one thing: he has senses for everything and of course for every single weaker and duller sense. (HW I, 714).

Human language is, according to Herder, the result of the expansion of the human 'sphere of action', of the consequent insufficient specificity of individual sensory faculties, compensated by the expansion of the imaginative capacity beyond the limit of physiological needs. This extension of the horizon endowes the human being not only with the freedom to perceive himself as an individual within an environment, but also to meditate on himself and his actions in the world:

> […] so wird er [der Mensch] freistehend, kann sich eine Sphäre der Bespiegelung suchen, kann sich in sich bespiegeln. Nicht mehr eine unfehlbare Maschine in den Händen der Natur, wird er sich selbst Zweck und Ziel der Bearbeitung.
>
> [[...] then he [the human being] becomes free, can look for a mirroring sphere, can mirror himself. No longer an infallible machine in the hands of nature, he becomes himself the purpose and aim of the work.] (HW I, 718).

It is therefore not a higher level of communication with others that determines the uniqueness of human language, but its being the product of what we would define as extended mind, deriving from the interaction with others and with the environment. Context codetermins human consciousness, identity, judgement, and the peculiarities of language:

> Es ist die 'ganze Einrichtung aller menschlichen Kräfte; die ganze Haushaltung seiner sinnlichen und erkennenden, seiner erkennenden und vollendeten Natur,' oder vielmehr - es ist 'die Einzige positive Kraft des Denkens, die mit einer gewissen Organisation des Körpers verbunden bei den Menschen so Vernunft heißt, wie sie bei den Tieren Kunstfähigkeit wird: die bei ihm Freiheit heißt, und bei den Tieren Instinkt wird'. Der Unterschied ist nicht in Stufen oder Zugabe von Kräften, sondern in einer ganz verschiedenartigen Richtung und Auswickelung aller Kräfte.
>
> [It is 'the whole institution of all human powers; the whole household of his sensual and cognitive, his cognitive and perfect nature,' or rather - it is 'the only positive power of thought which, connected with a certain organisation of the body, is called reason in humans as it becomes art in animals: which in him is called freedom, and in animals becomes instinct'. The difference is not in steps or addition of forces, but in a quite different direction and unfolding of all forces.] (HW I, 718).

The element which expresses the profound difference between humans and animals is the quality of thought and reflection, which creates in the human being the deep need to give shape to his/her inner world as well as to the world around him, activating the production of a tool to shape mental images derived from sensory and emotional experiences. Human language exists by virtue of man's ability to look at himself and the world, transferring out of himself his own experience through the word in first person and through narration in third person.

> Der Mensch in den Zustand von Besonnenheit gesetzt, der ihm eigen ist, und diese Besonnenheit (Reflexion) zum erstenmal frei würkend, hat Sprache erfunden. Denn was ist Reflexion? Was ist Sprache? […] Der Mensch beweiset Reflexion, wenn die Kraft seiner Seele so frei würket, daß sie in dem ganzen Ozean von Empfindungen, der sie durch alle Sinnen durchrauschet, Eine Welle, wenn ich so sagen darf, absondern, sie anhalten, die Aufmerksamkeit auf sie richten, und sich bewußt sein kann, daß sie aufmerke. […] Er beweiset also Reflexion, wenn er nicht bloß alle Eigenschaften, lebhaft oder klar erkennen; sondern eine oder mehrere als unterscheidende Eigenschaften bei sich anerkennen kann: der erste Aktus dieser Anerkenntnis giebt deutlichen Begriff; es ist das Erste Urteil der Seele - und - wodurch geschahe die Anerkennung? Durch ein Merkmal, was sehr absondern mußte, und was, als Merkmal der Besinnung, deutlich in ihn fiel. […] Dies Erste Merkmal der Besinnung war Wort der Seele! Mit ihm ist die menschliche Sprache erfunden.
>
> [The human being, placed in the state of self-reflecting, and freely expressing these thoughts for the first time, has invented language. For what is thought? What is language? Man demonstrates self-reflection when the power of his soul becomes so free that despite the whole ocean of sensations that rushes through all the senses, he is able to separate a wave, if I may say so, stop it, direct attention to it, and be aware that he is attentive. [...] He proves to be reflecting when he is able not only to recognize all the qualities, vivid or clear, but also to recognize one or more of them as distinguishing qualities in himself: the first act of this recognition gives birth to a clear concept; it is the soul's first judgement – and – what is the reason for this recognition? By a characteristic which had to be very distinct, and which, as a characteristic of reflection, fell clearly within it. [...] This

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first characteristic of reflection was the word of the soul! Human language was invented with it.] (HW I, 723-4).

As can be deduced from this important excerpt, the first word originates from the action of a vital energy, indicated here by Herder as *Seele* [soul], in order to express the embodied cognitive act of *Vernunft* [reason] through self-reflection, as well as the narrativization of his experience through words: "[…] alle Zustände der Besonnenheit in ihm [werden] sprachmässig: seine Kette von Gedanken wird eine Kette von Wortern." [[...] all states of self-reflection [become] in him linguistic: his chain of thoughts becomes a chain of words." (HW I, 775).

Language is not only an expression of *Empfindungen* (feelings), or of other human faculties such as *Vernunft* and *Besonnenheit*, but also an instrument capable of shaping the world, connecting natural history to the education of individuals and societies, and evolving, according to the laws of transformation that Herder traces out as valid for the cultural history of humanity. The different evolutionary levels of language are expressed in style, which means that the language of poetry corresponds to an era of primordial harmony, while prose corresponds to modernity, which can and must further expand its strength, in an inversion of its still unexpressed qualities. Language is, in fact, where human experience, natural and cultural, history and tradition interact, express and show themselves to the external world.

The relevance attributed to the corporeal dimension has allowed Herder to explore the most mysterious aspects of life, of the human mind and soul, as well as of history, philosophy and in the development of civilizations. The reinterpretation of his works in a cognitivist key allows us to appreciate Herder's work in the perspective of a global theory about the human being, able to overcome the gap between nature and culture. At the same time, Herder's cognitive issues allow us to rediscover the philosophical substratum of current scientific theories, whose premises draw back to the philosophical debate of the eighteenght Century. Thus, in a transdisciplinary perspective, we can resume the reflection on some still unsolved mysteries, which the human being has been facing since the beginning of time: mind, consciousness, imagination, memory, and most of all his/her being both a destroying demon and a creature capable of the highest works of genius. (RG)

Appendix

This study, part of a wider ongoing work on Johann Gottfried Herder, is the result of a collaborative research carried out by the two co-authors, whose names are indicated by initials in parentheses in the text.

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References Références Referencias

1. Aarsleff, Hans. *Da Locke a Saussure. Saggi sullo studio del linguaggio e la storia delle idee.* Mulino, 1984.
2. Allert, Beate, editor. *Herder: From Cognition to Cultural Science.* Synchron, 2016.
3. Barr Nisbet, Hugh. *Herder and the Philosophy of Science.* The Modern Humanities Research Association, 1970.
4. Baumgarten, Alexander Gottlieb. *Aesthetika.* Kleyb, 1750-58.
5. Baumgarten, Alexander Gottlieb. *Metaphysica*. Hildesheim, 1982, p. 176.
6. Beetz, Manfred, Garber, Jörn and Thoma, Heinz, editors. *Physis und Norm. Neue Perspektiven der Anthropologie im 18. Jahrhundert*. Wallstein, 2007.
7. Borchers, Stefan. *Die Erzeugung des »ganzen Menschen«. Zur Entstehung von Anthropologie und Ästhetik an der Universität Halle im 18. Jahrhundert*. De Gruyter, 2011.
8. Borchers, Stefan. "Totus homo oder ganzer Mensch? Zum Auftakt der Anthropologie an der Universität Halle." *Die Sachen der Aufklärung. Beiträge zur DGEJ-Jahrestagung 2010 in Halle a.d. Saale*, AA. VV., Meiner Verlag, 2012, pp. 552-59.
9. Brown, John. *Elements of Medicine.* Webster, 1780.
10. Caruana, Fausto and Viola, Marco. *Come funzionano le emozioni*, Il Mulino, 2018.
11. Cassmann, Otto. *Psychologia anthropologica: sive animae humanae doctrina methodice informata capitibus dissecta singolorumque capitum disquisitionibus ac controversarum questionem ventilationibus illustrata*. Fischerus, 1594.
12. Clark, Andy and Chalmers, David. "The Extended Mind." *Analysis*, 1998, vol. 58, no. 1, pp. 7-19.
13. Colombetti, Giovanna and Thompson, Evan. "Il corpo e il vissuto affettivo: verso un approccio «enattivo» allo studio delle emozioni." *Rivista di estetica*, 2008, vol. 37, pp. 77-96.
14. Cuccio, Valentina, Carapezza, Marco and Gallese, Vittorio. "Metafore che risuonano. Linguaggio e corpo tra filosofia e neuroscienze." *EC. Rivista dell'Associazione Italiana Studi Semiotici*, vol. 7, no. 17, 2013, pp. 69-74.

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15. Damasio, Antonio. *L'errore di Cartesio. Emozione, ragione e cervello umano,* Adelphi, 1995.
16. Damasio, Antonio. *Self Comes to Mind: Constructing the Conscious Brain.* Pantheon Books, 2010.
17. Damasio, Antonio *et al.* "Subcortical and cortical brain activity during the feeling of self-generated emotions." *Nature Neuroscience,* 2000, vol. 3, pp.1049-56.
18. Deacon, Terrence. "The Aesthetic Faculty". The Artful Mind, edited by M. Turner, Oxford UP, 2006.
19. Derrida, Jacques. *L'archeologia del frivolo. Saggio su Condillac.* Dedalo, 1992.
20. De Angelis, Simone. *Anthropologien. Genese und Konfiguration einer «Wissenschaft vom Menschen» in der Frühen Neuzeit.* De Gruyter, 2010.
21. Faschilli, Claudio. "La negazione e le teorie simulative della comprensione linguistica." *Rivista Italiana di Filosofia del Linguaggio. Azione, percezione e linguaggio*, 2012, vol. 5.
22. Freedberg, David and Gallese, Vittorio. "Motion, Emotion and Empathy in Aesthetic Experience." *Trends in Cognitive Sciences,* vol. 11, no. 5, 2007, pp. 197-202.
23. Gaier, Ulrich. "The Problem of Core Cognition in Herder." *Monatshefte*, vol. 95, no. 2, 2003, pp. 294-309.
24. Gall, Franz Joseph. "Des Herrn Dr. F.J. Gall Schreiben über seinen bereits geendigten Prodromus über die Verrichtungen des Gehirns der Menschen und Thiere an Herrn Joseph Freiherr von Retzer." *Der Neue Teutsche Merkur*, 1798, pp. 311-82.
25. Gall, Franz Joseph. *Philosophisch-medicinische Untersuchungen über Natur und Kunst im kranken und gesunden Zustande des Menschen*, Rudolph Grässer und Comp., 1791.
26. Gallese, Vittorio. "Arte, Corpo, Cervello: Per un'estetica sperimentale." *Micromega*, vol. 2, 2014, pp. 49-67.
27. Gallese, Vittorio. "Before and below Theory of Mind: Embodied Simulation and the Neural Correlates of Social Cognition." *Philosophical Transactions of the Royal Society of London Biological Sciences*, vol. 362, no. 1480, 2007, pp. 659-69.
28. Gallese, Vittorio. "Corpo non mente. Le neuroscienze cognitive e la genesi di soggettività e intersoggettività." *Educazione sentimentale*, vol. 20, 2013, pp. 8-24.
29. Gallese, Vittorio. "Embodied Simulation and its Role in Cognition." *Reti, saperi, linguaggi*, vol. 1, no. 7, 2018, pp. 31-46.
30. Gallese, Vittorio. "Embodied Simulation: From Neurons to Phenomenal Experience." *Phenomenology and the Cognitive Sciences*, vol. 4, no.1, 2004, pp. 23-48.
31. Gallese, Vittorio. "Finding the Body in the Brain. From Simulation Theory to Embodied Simulation." *Goldman and His Critics*, edited by Brian McLaughlin and Hilary K. Kornblith, John Wiley & Sons, 2016.
32. Gallese, Vittorio. "Io so quel che tu pensi." *Il sole 24 ore*, 2006, n. 56.
33. Gallese, Vittorio. "Motor Abstraction: A neuroscientific Account of how Action Goals and Intentions are mapped and understood." *Psychological Research*, vol. 73, 2009, pp. 486-98.
34. Gallese, Vittorio. "Naturalizing Aesthetic Experience. The Role of (Liberated) Embodied Simulation." *Projections*, vol. 12, no. 2, 2018, pp. 50-59.
35. Gallese, Vittorio. "The Empathic Body in Experimental Aesthetics – Embodied Simulation and Art." *Empathy*, Palgrave Studies in the Theory and History of Psychology, 2017.
36. Gallese, Vittorio. "The Problem of Images: A view from the Brain-Body." *Phenomenology and Mind*, no.14, 2018, pp. 70-79.
37. Gallese, Vittorio and Ammaniti, Massimo. *La nascita della intersoggettività. Lo sviluppo del sé tra psicodinamica e neurobiologia*. Cortina, 2014.
38. Gallese, Vittorio and Cuccio, Valentina. "The Paradigmatic Body. Embodied Simulation, Intersubjectivity and the Bodily Self." *Open MIND*, edited by Thomas Metzinger and Jennifer Windt, MIND Group, 2015, pp. 1-23.
39. Gallese, Vittorio and Guerra, Michele. *Lo schermo empatico. Cinema e neuroscienze*. Cortina, 2015.
40. Gallese, Vittorio and Lakoff, George. "The Brain's Concepts: the Role of the Sensory-motor System." *Conceptual Knowledge. Cognitive Neuropsychology*, vol. 22, n. 3/4, 2005, pp. 455-79.
41. Gallese, Vittorio and Stern, Daniel. *Psychothérapie et neurosciences: une nouvelle alliance. De l'intersubjectivité aux neurones miroir*. Fabert, 2015.
42. Gallese, Vittorio *et al.* "Action Recognition in the Premotor Cortex." *Brain*, vol. 119, 1996, pp. 593-609.
43. Gallese, Vittorio *et al.* "A Unifying View of the Basis of Social Cognition." *Trends in Cognitive Sciences*, 2004, vol. 8, pp. 396-403.
44. Gambino, Renata and Pulvirenti, Grazia. *Storie Menti Mondi. Approccio neuroermeneutico alla letteratura*, Mimesis, 2018.
45. Garber, Jörn and Thoma, Heinz, editors. *Zwischen Empirisierung und Konstruktionsleistung: Anthropologie im 18. Jahrhundert*. Niemeyer, 2004.
46. Gehlen, Arnold. *L'Uomo. La sua natura e il suo posto nel mondo*, Mimesis, 2010.
47. Gjesdal, Kristin. "Herder's Hermeneutics. History, Poetry, Enlightment." *Journal of the History of Philosophy,* vol.56, no. 4, 2017, p. 3.

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48. Goethe, Johann Wolfgang. "Campagne in Frankreich." *Goethes Werke*, edited by E. Trunz, DTV, 1994, vol. 10, p. 314.
49. Häfner, Ralph. "«L'âme est une neurologie en miniature». Herder und die Neurophysiologie Charles Bonnets.". *Der ganze Mensch. Anthropologie und Literatur im 18. Jahrhundert. DFG – Symposion 1992*, Schings, Hans-Jurgen, Metzler, 1994, pp. 390-409.
50. Herder, Johann Gottfried. "Abhandlung über den Ursprung der Sprache." *Werke in Zehn Bänden*, edited by Gunter Arnold, Martin Bollacher et al, Deutscher Klassiker Verlag, 1765, vol 1, pp. 697-810. For quotations from Herder's works, referring to this publication, we will use the abbreviation HW, followed by the volume number in Roman numerals and the number of pages in Arabic numerals.
51. Herder, Johann Gottfried. "Brief an Lavater nach dem 20. 2. 1775." *Paralipomena*, *Werke in Zehn Bänden*, edited by Gunter Arnold, Martin Bollacher et al, Deutscher Klassiker Verlag, 1765, vol 4, pp. 1034.
52. Herder, Johann Gottfried. "Plastik. Einige Wahrnehmungen über Form und Gestalt aus Pygmalions bildendem Traume." *Werke in Zehn Bänden*, edited by Gunter Arnold, Martin Bollacher et al, Deutscher Klassiker Verlag, 1765, vol. 4, pp. 244-326.
53. Herder, Johann Gottfried. "Vom Erkennen und Empfinden der menschlichen Seele." *Werke in Zehn Bänden*, edited by Gunter Arnold, Martin Bollacher et al, Deutscher Klassiker Verlag, 1765, vol 4.
54. Herder, Johann Gottfried. "Wie die Philosophie zum Besten des Volkes allgemein und nützlich warden kann." *Werke in Zehn Bänden*, edited by Gunter Arnold, Martin Bollacher et al, Deutscher Klassiker Verlag, 1765, vol. 1, p. 122.
55. Herder, Johann Gottfried. *Zum Sinn des Gefühls* (1769), in *Werke in Zehn Bänden*, edited by Gunter Arnold, Martin Bollacher et al, Deutscher Klassiker Verlag, IV, 235-242.
56. Husserl, Edmond. *Idee per una fenomenologia pura e per una filosofia fenomenologica. Vol. 3: La fenomenologia e i fondamenti delle scienze*, Einaudi, 1976-1982.
57. Husserl, Edmond. *Meditazioni cartesiane e Lezioni parigine*. Editrice La Scuola, 2017.
58. Hustvedt, Siri, Gallese, Vittorio *et al*. *Fühlen - Denken - Erinnern: Schreiben zwischen Wissenschaft und Poesie: Tübinger Poetik Dozentur 2016*. Swiridoff Verlag, 2017.
59. Iacoboni, Marco. "Existential Empathy: the Intimacy of Self and Other." *Empathy in Mental Illness*, edited by T.F.D. Farrow and Peter Woodruff, Cambridge UP, 2007, pp. 310-321.
60. Iacoboni, Marco *et al.* "Grasping the intentions of others with one's own mirror neuron system." *Plos Biology*, 2005, vol. 3.
61. Irmscher, Hans Dietrich. "Bemerkungen zur Funktion der Analogie im Denken Herders." *Deutsche Vierteljahrschrift fuï Literaturwissenschaft und Geistesgeschichte*, 1981, vol. 55.
62. Irmscher, Hans Dietrich, *Johann Gottfried Herder*. Reclam, 2001.
63. Johnson, Mark and Rohrer, Tim. "We are Live Creatures: Embodiment, American Pragmatism, and the Cognitive Organism." *Body, Language, and Mind*, 2007, vol. 1, pp. 17-54.
64. Kant, Immanuel. "Kritik der reinen Vernunft.", *Kant's Gesammelte Schriften*, edited by Berlin Academy of Sciences, de Gruyter, Berlin 1910-1983, vol. 3, pp. 1-152.
65. Koschorke, Albrecht. *Körperströme und Schriftverkehr. Mediologie des 18. Jahrhunderts*. Fink,1999.
66. Košenina, Alexander. *Ernst Platners Anthropologie und Philosophie. Der philosophische Arzt und seine Wirkung auf Johann Karl Wezel und Jean Paul.* Königshausen & Neumann, 1989.
67. Lange, Thomas and Neumeyer, Harald, editors. *Kunst und Wissenschaft um 1800*. Königshausen und Neumann, 2000.
68. Lakoff, George and Johnson, Mark. *Metaphors We Live By*. Chicago UP 1980.
69. Lakoff, George and Johnson, Mark. *Philosophy in the Flesh.* Basic Books, 1999.
70. Lesky, Erna, editor. *Franz Joseph Gall 1758-1828. Naturforscher und Anthropologe.* Huber, 1979.
71. Lesky, Erna, "Gall und Herder." *Clio Medica*, 1967, vol.2.
72. Löchte, Anne. *Johann Gottfried Herder: Kulturtheorie und Humanitätsidee der Ideen, Humanitätsbriefe und Adrastea*. Königshausen & Neumann, 2005.
73. Marelli, Francesco. *Fisica dell'anima. Estetica e antropologia in J.G. Herder*. Mimesis, 2012, p. 13.
74. Marino, Mario. *Da Gehlen a Herder, origine del linguaggio e ricezione di Herder nel pensiero antropologico Tedesco.* Il Mulino, 2008, p. 104.
75. Maturana, Humberto and Varela, Francisco. *Autopoiesis and Cognition: The Realization of the Living*. Reidel Publishing, 1980.
76. Maturana, Humberto and Varela, Francisco. *Autopoiesi e cognizione. La realizzazione del vivente*, Marsilio, 1985.
77. Maturana, Humberto and Varela, Francisco. *L'albero della conoscenza*. Garzanti, 1987.
78. Meyer, Anna-Rose. *Homo dolorosus. Körper – Schmerz – Ästhetik*, Fink, 2011.
79. Müller, Johann, Georg, editor. *Erinnerungen aus dem Leben Joh. Gottfrieds von Herder*, *Sämtliche Werke*, edited by K.Fr.A. Schelling and J.G. Cotta, 1856-1861, vol. 12, no. 109.

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80. Newen, Albert, De Bruin, Leon and Gallagher, Shaun, editors. *The Oxford Handbook of 4E Cognition*. OUP, 2018.
81. Noë, Alva, "Vision without Representation." *Perception, Action, and Consciousness: Sensorimotor Dynamics and Two Visual Systems*, edited by Nivedita Gangopadhyay, Michael Madary and Finn Spicer, Oxford University Press, 2010.
82. Offray de La Mettrie, Julien. *L'Homme Machine.* Elie Luzac Fils, 1747.
83. Pace, Alessandra, Gallese Vittorio *et al*. *Mirror Images: Spiegelbilder in Kunst und Medizin / Reflections in Art and Medicine*. Verlag für Moderne Kunst, 2017.
84. Platner, Ernst. *Anthropologie für Ärzte und Weltweise. Erster Teil*. Dyc, 1772.
85. Rizzolatti, Giacomo *et al.* "Functional Organization of Inferior Area 6 in the Macaque Monkey. II. Area F5 and the Control of Distal Movements." *Experimental Brain Research*, 1988, vol. 71, no. 3, pp. 491-507.
86. Rizzolatti, Giacomo *et al.* "Motor and Cognitive Functions on the Ventral Premotor Cortex." *Current Opinion in Neurobiology*, 2002, vol. 12, pp. 149-54.
87. Rizzolatti, Giacomo *et al.* "Neurophysiological Mechanisms underlying the Understanding and Imitation of Action." *Nature Reviews Neuroscience*, 2001, vol. 2, pp. 661-70.
88. Rizzolatti, Giacomo *et al.* "Premotor Cortex and the Recognition of Motor Actions." *Cognitive Brain Research*, 1996, vol. 3, pp. 131-141.
89. Rizzolatti, Giacomo and Sinigaglia, Corrado. *So quel che fai. Il cervello che agisce e i neuroni specchio*. Raffaello Cortina, 2006, p. 4.
90. Rizzolatti, Giacomo and Sinigaglia, Corrado. "The Functional Role of the Parieto-frontal Mirror Circuit: Interpretations and Misinterpretations." *Nature Reviews Neuroscience*, 2010, vol. 11, no. 4, pp. 264-74.
91. Rothschuh, Karl. "Naturphilosophische Konzepte der Medizin aus der Zeit der deutschen Romantik." *Romantik in Deutschland,* edited by R. Brinkmann, Metzler, 1978, pp. 243-267.
92. Roughley, Neil. *Being Humans: Anthropological Universality and Particularity in Transdisciplinary Perspectives*. De Gruyter, New York, 2012.
93. Sauder, Gerhard. "Sinnliche Erkenntnis: Der Kontext von Herders 'Abhandlung Vom Erkennen und Empfinden der menschlichen Seele'." *Herder: From Cognition to Cultural Science* edited by Beate Allert, Synchron, 2016, pp. 137-53.
94. Sauder, Gerhard. *Empfindsamkeit*. *Voraussetzungen und Elemente*. Metzler, 1974.
95. Schelling, Friedrich Wilhelm Joseph. "Ideen zu einer Philosophie der Natur." *Werke. Historisch-kritische Ausgabe*, edited by Baumgartner *et al.*, Frommann-Holzboog, 1975, vol. 5, p. 107.
96. Schelling, Friedrich Wilhelm Joseph "Von der Weltseele. Eine Hypothese der höheren Physik zur Erklärung des allgemeinen Organismus." *Sämtliche Werke*, edited by K.Fr.A. Schelling and J.G. Cotta, 1856-1861, vol. 2.
97. Schings, Hans-Jurgen. *Der ganze Mensch. Anthropologie und Literatur im 18. Jahrhundert. DFG – Symposion 1992*. Metzler, 1994, p. 1.
98. Simon, Ralf. "Goethes Denken in Analogien. Zur literarischen Epistemologie der Ähnlichkeiten als Horizontalisierung der Reflektion." *Ähnlichkeit um 1800. Konturen eines literatur- und kulturtheoretischen Paradigmas am Beginn der Moderne*, edited by J.-K. Patrutt, R. Rössler, Aisthesis Verlag, 2019.
99. Sohni, Hans. *Die Medizin der Frühromantik.* Schulz Verlag, 1973.
100. Stöckmann, Ernst. *Anthropologische Ästhetik. Philosophie, Psychologie und ästhetische Theorie der Emotionen im Diskurs der Aufklärung*. Niemeyer, 2009.
101. Thelen, Ester *et al.* "Empathy and Consciousness." *Journal of Consciousness Studies*, 2001, vol. 8.
102. Thelen, Ester *et al.* "The Dynamics of Embodiment." *Behavioral and Brain Sciences*, 2001, vol. 24, pp. 1-86.
103. Thompson, Evan. Mind in Life. Biology, Phenomenology and the Science of Mind. Harvard UP, 2010.
104. Thompson, Evan. "Empathy and Consciousness". *Journal of Consciousness,* vol. 8, 2001, pp. 5-7.
105. Umiltà, Maria Alessandra *et al.* "I know what you are doing. A neurophysiological study." *Neuron*, 2001, vol. 31, no. 1, pp. 156-65
106. Varela, Francisco, Thompson, Evan, Rosch Eleanor, editors, *The Embodied Mind. Cognitive Science and Human Experience*, MIT Press, 1991.
107. Verra, Valerio. "Die Vergleichungsmethode bei Herder und Goethe." *Bausteine zu einem neuen Goethe*, edited by P. Chiarini, Athenäum, 1987.
108. Vila, Anne. "The Sensible Body: Medicine and Literature in Eighteenth-Century France." Diss., University Microfilms Internat., 1990.
109. Von Haller, Albrcht. *Primae lineae physiologiae in usum praelectionum academicarum auctae et emendatae*, 1751.
110. Von Hardenberg, Friedrich. *Die Werke Friedrich von Hardenbergs*. Wissenschaftliche Buchgesellschaft, 1960-2006, vol. 4.
111. Waldow, Anik and Nigel DeSouza. *Herder: Philosophy and Anthropology*. Oxford University Press, 2017.
112. Weiler, Christina. "The Romantic Roots of Cognitive Poetics: A Comparative Study of Poetic Metaphor in Herder, Novalis, Wordsworth, Coleridge, and Shelley." Diss. Purdue U, 2017.

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113. Wojciehowski, Hannah and Gallese, Vittorio. "Introduction. Narrative and the Biocultural Turn." *Costellazioni. Rivista di Lingue e letterature*, vol. 5, 2018, pp. 9-21.
114. Zahavi, Dan. *Husserl and Transcendental Intersubjectivity: A Response to the Linguistic-Pragmatic critique*, Ohio University Press, 2001.
115. Zelle, Carsten. "Commercium mentis et corporis. La contribution de Johann Gottlob Krüger à l'anthropologie littéraire autour de 1750." *Revue Germanique Internationale*, vol. 10, 2009, pp. 11-29.
116. Zelle, Carsten, editor. *«Vernünftige Ärzte». Hallesche Psychomediziner und die Anfänge der Anthropologie in der deutschsprachigen Frühaufklärung*. Niemeyer, 2001.
117. Zelle, Carsten. "Zur Idee des »ganzen Menschen« im 18. Jahrhundert." *Beiträge zum II Internationalen Kongress für Pietismusforschung*. Verlag der Frankeschen Stiftungen im Max Niemeyer, 2009, pp. 45-61.

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Mental Illness at Work- Forms of Managerial Intervention

By Markus Fischl

Abstract- Mental illness is still a gray area at most Austrian companies and remains associated with various stigmas, even though nearly one in every 10 days of sick leave is due to mental illness. This causes the phenomenon of presenteeism, and it also results in a considerable cost for the business and the economy as well as losses in productivity. Numbers of sick days taken due to mental illness are growing significantly, and this trend can only be counteracted with a corporate culture of openness, education, and destigmatization, and by taking the appropriate measures in all aspects of prevention. Both companies and politicians are therefore called upon to become proactive by creating the appropriate framework.

Keywords: mental illness, early intervention, presenteeism, awareness, destigmatization, workplace.

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Mental Illness at Work– Forms of Managerial Intervention

Markus Fischl

Abstract- Mental illness is still a gray area at most Austrian companies and remains associated with various stigmas, even though nearly one in every 10 days of sick leave is due to mental illness. This causes the phenomenon of presenteeism, and it also results in a considerable cost for the business and the economy as well as losses in productivity. Numbers of sick days taken due to mental illness are growing significantly, and this trend can only be counteracted with a corporate culture of openness, education, and destigmatization, and by taking the appropriate measures in all aspects of prevention. Both companies and politicians are therefore called upon to become proactive by creating the appropriate framework.

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I. Introduction

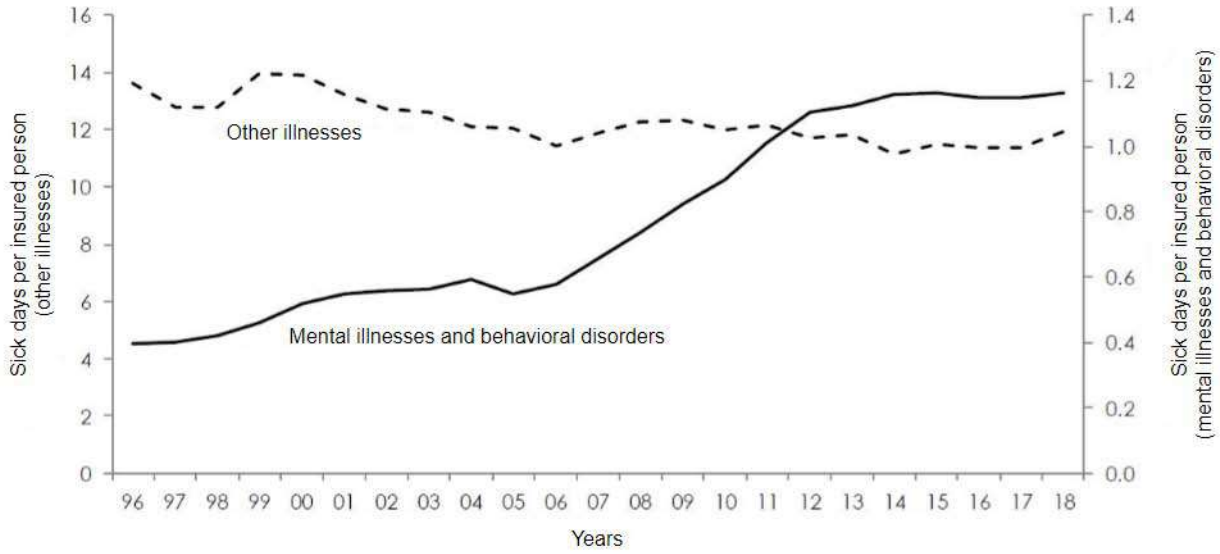


Figure 1: Development of mental illness (source: Austrian association of social insurance providers)

Since the mid-1990s, statistics produced by the Austrian association of social insurance providers have shown a clear trend with a high growth rate: While the number of absences caused by other significant illness groups such as injuries, cardiovascular disease, and respiratory, muscular and skeletal disease has declined slightly, the number of sick days caused by mental illness has almost tripled over the same period (Fig. 1).

However, the actual significance of these mental health problems for the overall health of the labor force is difficult to estimate on the basis of these statistics. It is clear that over this period doctors have been more prepared to attribute health problems to mental causes. But it is safe to assume that numerous cases of sick leave, some of which are caused by poor mental health, continue to be attributed to other illness groups due to the symptoms present when the diagnosis is made. For example, complaints such as allergies, stomach ache, and circulation problems can be caused by stress and psychological strain without the resulting cases of sick leave being attributed to mental health problems.

The major significance of mental stress and illness in the working environment can be confirmed with other sources. Studies have repeatedly shown that depression, stress, and anxiety are among the health problems most frequently cited by employees in relation to their job. The OECD estimates that in its member states between 20 and 25% of the working-age population are affected by clinical mental health issues. Around 5% have serious mental disorders, while the remaining 15% have minor to moderate disorders [1].

The average duration of sick leave taken by individual employees as a result of mental illness is 34.6

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days per incident – nearly four times as long as for somatic illnesses, which on average across all illness groups result in just 9.6 sick days per incident (Fig. 2) [2].

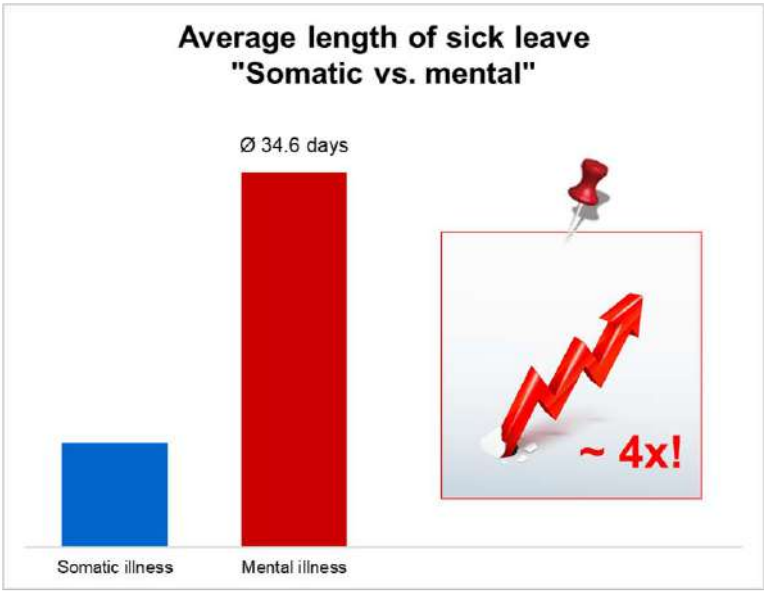


Figure 2: Average length of sick leave, "Somatic versus mental". (© M. Fischl)

But how can this huge increase in illnesses and sick leave be explained? Has mental stress at work increased in recent years? Have employees become less resilient? Is it that we can now talk more openly about mental disorders, so that we are finally seeing the true extent of the burden of disease? Are we better at diagnosing mental health problems than we were before?

All these reasons play their part to a certain extent.

II. Spiraling Costs

As the data shown above make clear, psychiatric illness has become a major cost factor for businesses and the Austrian economy as a whole. And the pension statistics also reveal some extremely alarming figures: the 2019 annual report produced by the Austrian pension insurance institution shows that 6.6% of working-age people in Austria are disabled or unable to work. The largest cause of early retirement is mental illness (43.8%), a long way clear of the next-highest causes – musculoskeletal conditions (17.4%) and nervous system disorders (7.9%) – while 66.1% of people claiming rehabilitation allowance were doing so as a result of mental illness [3] (Fig. 3, 4, 5).

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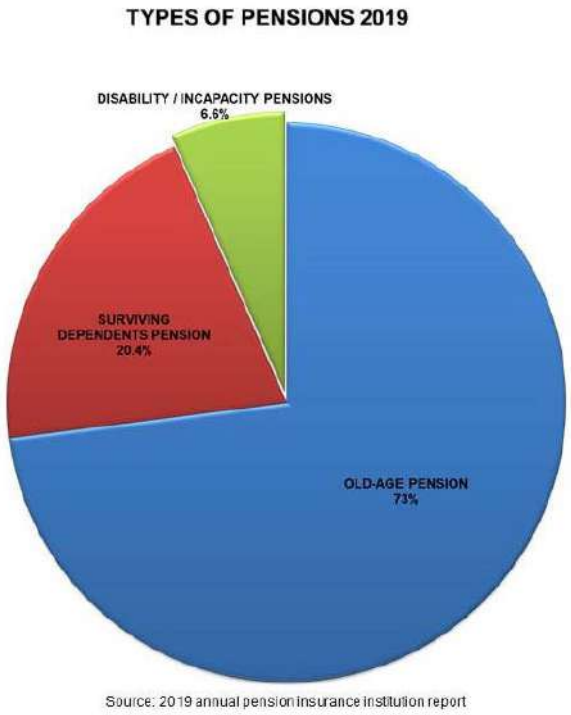


Figure 3: Types of pensions 2019. (© M. Fischl)

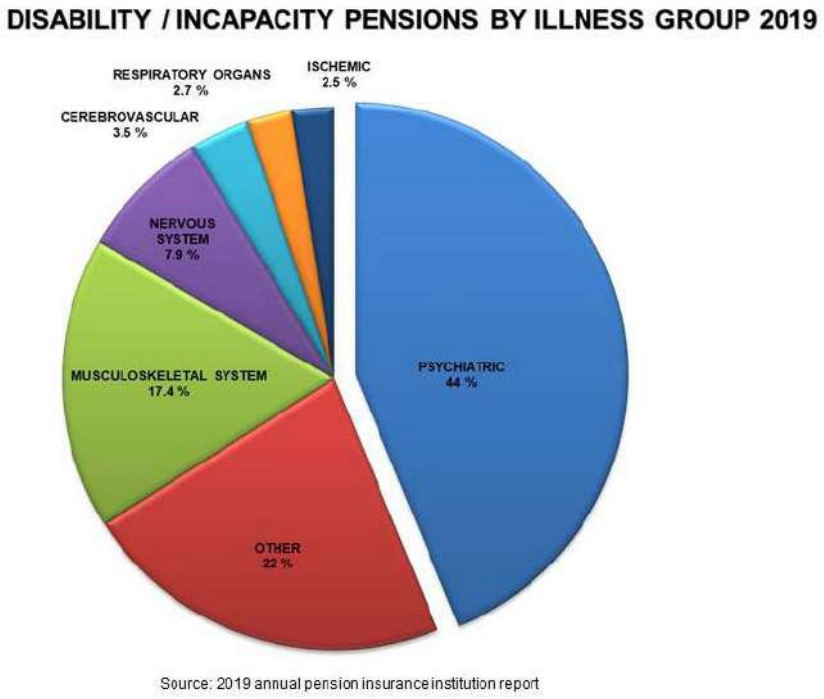


Figure 4: Disability/incapacity pensions by illness group 2019. (© M. Fischl)

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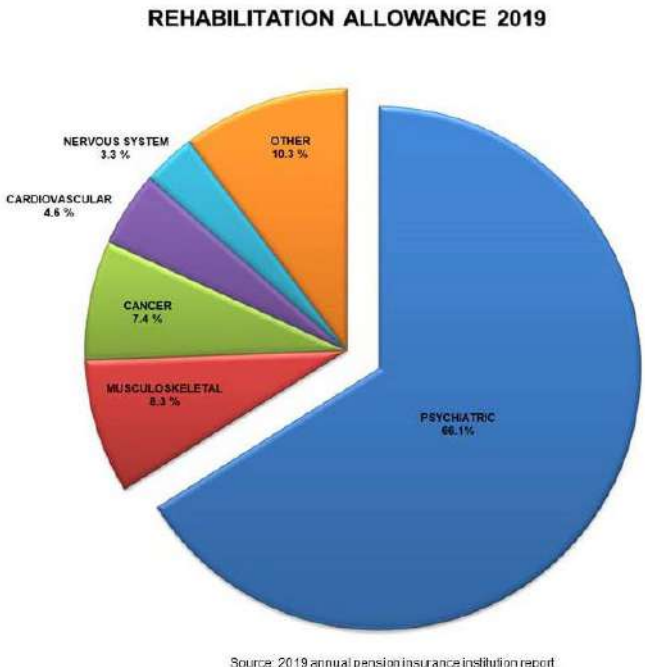


Figure 5: Rehabilitation allowance 2019. (© M. Fischl)

Taking into account the fact that disorders are frequently under-diagnosed and misdiagnosed for a variety of reasons, the increase in absences from work as a result of mental health problems is even bigger than shown by the statistics.

a) Presenteeism and absenteeism

In addition to longer periods of absence and incapacity for work, there is the problem of reduced productivity and performance from those employees who frequently come into work when they are ill. This phenomenon is known as "presenteeism".

Employees suffering from depression, for example, make more mistakes at work and do not work as quickly as their healthy colleagues. Typical symptoms of this illness, such as impaired concentration and ability to retain information, negatively impact performance, and sufferers also tend to withdraw socially from their working environment, which can add to the strain on the rest of their team.

By contrast to presenteeism, there is the problem known as absenteeism, which refers to feigning illness when the person is in fact fully able to work. Presenteeism and absenteeism are also called "motivated absence", and just like absences caused by health issues they have a harmful short and long-term impact both economically and socially. The 2018 Austrian workplace absence report, which focused on this issue, concluded that both absenteeism and presenteeism can be influenced by personality traits [see below], but also that workplace and organizational factors (such as corporate culture and leadership) and structural factors (such as workplace safety) play a role [4].

The 2018 workplace absence report identified the following primary risk factors for presenteeism at a personal level:

- Problems setting personal boundaries,
- A strong feeling of loyalty towards managers and colleagues,
- A sense of obligation towards customers/clients,
- Work that can only be performed by the individual in question, e.g. in the case of staff shortages or a high level of specialization,
- A strong sense of camaraderie within teams, e.g. when working on projects with tight deadlines [4].

The report identified the following risk factors at an organizational or structural level:

- Poor leadership and corporate culture, e.g. when there is little respect, trust, or support between management and employees, or when employees are suspected of not having genuine reasons for absences,
- High working demands with inadequate support [4].

In the workplace absence report, presenteeism and absenteeism were measured on the basis of self-reporting collected by surveys. The available survey data clearly show that they are issues of considerable importance for the Austrian economy.

Data from the 2014 Austrian Health Survey, alongside analysis carried out by the Upper Austrian Chamber of Labour in its Work Climate Index and Employee Health Monitor for the period between 2008 and 2017, show that over the course of a year around half of Austrian employees display presenteeism [4].

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Across all sectors, those who displayed presenteeism gave the following reasons:

- A sense of obligation towards colleagues (60%),
- Lack of a substitute (33%),
- Worry about work that would otherwise not be done (35%),
- Fear of negative consequences (16%),
- Either having themselves had previous problems at work relating to sick leave, or knowing that someone else at the company/organization had these problems (around 15%).

However, the 2018 workplace absence report noted considerable differences between the sectors and the qualifying groups [4].

b) Economic impact of mental illness in Austria and Europe

A report produced by the OECD and the European Commission (Health at a Glance: Europe 2018) revealed that mental illnesses such as depression, anxiety and alcohol/drug addiction affect more than one in six EU citizens. In addition to the impact on citizens' wellbeing, the OECD estimates that the total cost is over 600 billion euros – or more than 4% of GDP – across the 28 EU countries. A large part of this cost can be attributed to lower employment rates and reduced productivity from people with mental illness (1.6% of GDP or 260 billion euros) and to higher social insurance spending (1.2% of GDP or 170 billion euros), while the rest is accounted for by direct spending on healthcare provision (1.3% of GDP or 190 billion euros) [5].

Millions of people would benefit from earlier diagnosis and treatment of mental illness. The study showed that in Austria the cost is 4.33% of GDP (thus amounting to 15 billion euros), somewhat higher than the European average [5].

The high cost of mental illness for patients, families, employers and the wider economy has also been highlighted by the British publication "Mental Health in the Workplace" [6]. It is therefore little surprise that improving mental health at work has become a key strategic focus. This increased interest has led to new reviews of the evidence base in relation to common mental disorders and to the introduction of policies aimed at boosting mental health and wellbeing in the workplace.

In particular, it has been argued that employers should provide safe and supportive working environments and improve work organization – though this can be difficult in practice. One reason is that mental illness continues to be viewed as an individual's problem, with the associated stigma, and another is that people confronted with these problems in the workplace (e.g. senior managers, line managers, and HR specialists) often lack the necessary skills to handle them. In addition, access to professional occupational health services is frequently inadequate, especially for employees at SMEs [6].

III. Managerial Measures to Combat Mental Illness

Effective prevention of mental disorders in employees can only be successful if it is adopted as a corporate goal and if a solution-oriented approach to improve mental health is agreed in consultation with all employees. A crucial aspect of this is company-wide support in removing the taboo surrounding this issue, alongside the provision of information and guidance for managers and employees [7].

a) Destigmatization and raising awareness of mental illness

There remains a stigma around being mentally ill. Inadequate knowledge about mental illness and the associated stigmas have harmful consequences on the mental health of those affected.

There are three main forms of stigma:

- Public stigmatization: Discrimination by work colleagues, managers, and the population as a whole on the basis of mental illness.
- Self-stigmatization: The person affected internalizes these negative perceptions.
- Structural discrimination: Mental illness is not allocated the same resources by health and pension insurance providers as somatic illnesses.

Prejudices and stereotypes remain widespread: Those suffering from mental illness are considered dangerous, unpredictable, incurable, and even likely to display violent behavior. It is also incorrectly assumed that there is a clear boundary between being mentally healthy and mentally ill, when in fact, mental health is constantly in a state of flux. The preconception that those affected are at fault for their own suffering leads to a lack of understanding and can even cause hostile reactions, and those who are mentally ill are often treated with fear or simply avoided. On top of this, a vague (but very common) sense of "being normal" remains a barrier to opening up about mental health.

These forms of stigmatization have the following consequences:

- Those affected become withdrawn within their team,
- They and their families suffer from a lower sense of self-worth,
- They begin to feel guilt and shame,
- They only begin psychiatric/psychotherapeutic therapy belatedly or not at all, as they don't want to be labeled as "mentally ill" by undergoing this therapy,
- In a worst case scenario, suicide is seen as the last and only "way out".

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These factors make clear the importance of raising awareness of the nature and context of mental illness, particularly in a business environment [8].

Awareness campaigns at work

One of the key steps that can be taken to improve people's basic understanding of this issue are awareness campaigns on the facts and figures, available treatments, and wider context surrounding mental illness in today's workplace. These should aim to involve all employees, no matter where they are in the company hierarchy, and can for example be conducted through "Mental Health Awareness Days" or employee events.

It is recommended that the following messages (among others) be conveyed to employees:

– One in three Austrians will suffer from mental illness at some point in their life ("It can happen to anyone").
– Mental illness can be treated effectively.
– Seeking professional help is no reason to feel ashamed ("the sooner the better").
– There are treatments available and people to talk to in a psychosocial network ("Where can I turn to if I need help?").

There are lots of creative ways to design destigmatization campaigns using a variety of media. For example, the content can consist of videos of those affected (whether employees or senior managers) talking about their experience of mental illness and how they returned to work. The key message to convey is: "If only I'd done something about it earlier, I'd have made things a lot easier for myself!". This testimony, alongside informational material and e-learning tools, can help improve general awareness of mental illness.

b) Forms of prevention at work

In a business context, a distinction is made between primary, secondary and tertiary prevention (Fig. 6). Primary prevention is aimed at healthy employees in order to prevent illness, secondary prevention focuses on early detection of illness, and tertiary prevention refers to rehabilitation of those who already have an illness.

We also distinguish between behavioral prevention and situational prevention. Behavioral prevention refers to individuals' health behavior, while situational prevention – also called structural prevention – looks at workplace conditions (Fig. 6).

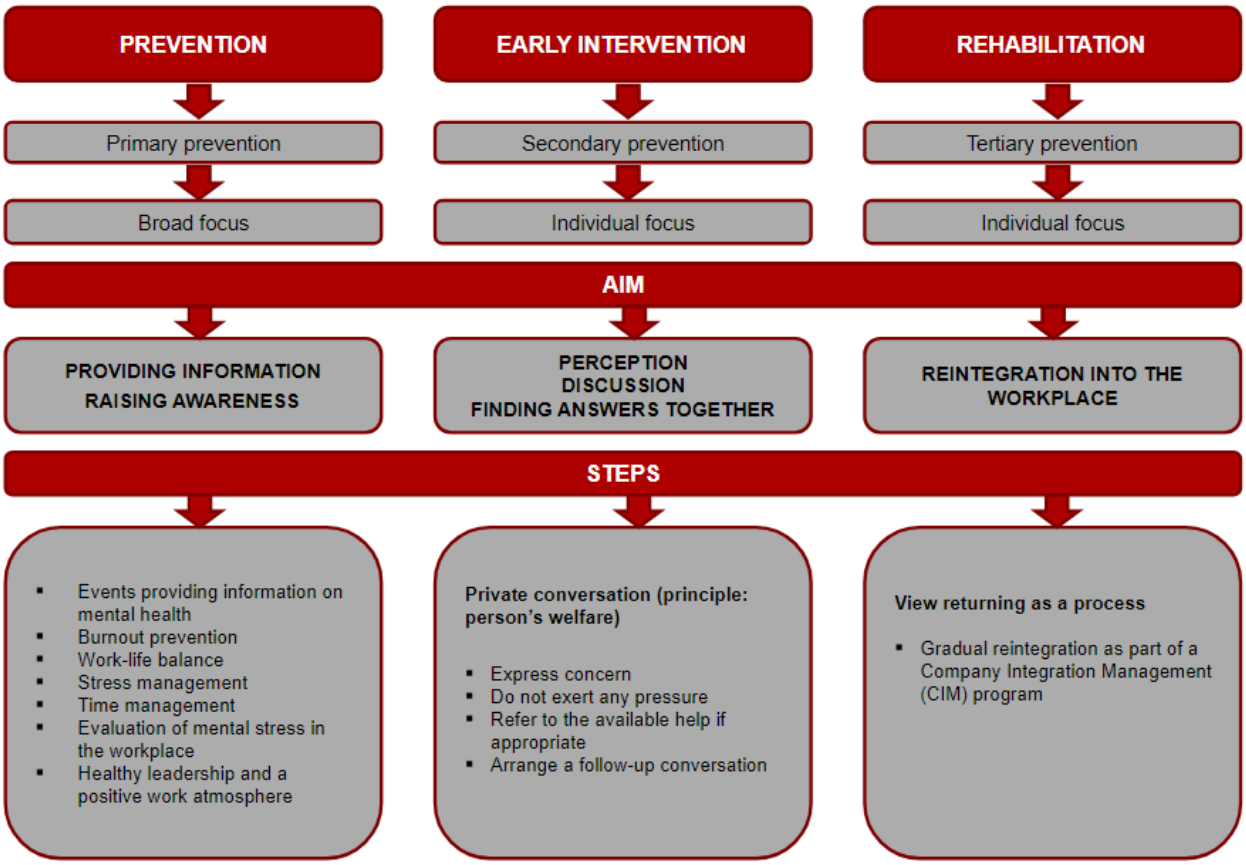


Figure 6: Primary, secondary, and tertiary prevention. (© M. Fischl)

Primary prevention to combat mental illness

A study on prevention, conducted in Germany as part of the "New Quality of Work" Initiative (INQA) [9] and funded by the German Federal Ministry of Labour and Social Affairs, investigated what employees understand by good work, the extent to which real-life

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work conditions meet these expectations, and which aspects are beneficial for mental wellbeing and keep employees healthy.

The following were identified as essential requirements for good work [9]:

- A secure job with a secure income (92%)
- Meaningful, varied work (85%)
- The social aspect of work (84%)
- Health and safety (74%)
- Scope for influence and freedom to act (71%)
- Opportunities for development (66%)
- High-quality management (66%)

The INQA study showed that in many sectors work conditions were no better than "average", meaning that there is room for improvement in various respects. As a result of the study, the following approaches can be recommended to help prevent mental disorders:

- A respectful, supportive management style,
- A corporate culture explicitly aimed at improving mental health in its mission statement,
- Steps to protect employees with an evaluation of the risk of mental stress factors,
- Measures to promote a positive work atmosphere,
- Opportunities for personal development,
- Sufficient potential to have an influence in order to identify more strongly with the company,
- Policies to enable a good work-life balance,
- Establishing a culture based on trust,
- Work perceived as being meaningful and varied.

Behavioral prevention strategies provide opportunities to improve health skills, such as learning about personal stress and time management, resilience training, and mindfulness-based interventions [8]. However, few well-designed evaluation studies have been carried out on resilience training and mindfulness-based interventions in a professional environment [10].

Primary preventive measures are in principle always to be welcomed, but the real challenge for companies and managers is reacting promptly and appropriately to specific cases, i.e. employees who are already showing the first signs of possible mental illness.

Secondary prevention (early intervention)

A survey of 312 psychiatrists in Germany showed that around 26% of all mental illnesses are primarily caused by stressful circumstances at work – and that figure is growing [11]. This makes early intervention especially important, alongside the primary preventive steps mentioned above.

Mental illness develops over a long period of time, which should provide a sufficiently large window of opportunity to intervene early and effectively. However, this requires a certain level of sensitivity on the part of business management to notice the behavioral changes and drop in performance of an affected employee that indicate undue levels of mental stress.

Early warning signs include:

- Chronic irritability, frequent conflicts with colleagues,
- Withdrawal from the team, resigned behavior,
- Drops in performance at work, frequent excuses for incomplete work,
- Crying without an obvious reason.

These are just some examples of behavior that may indicate the onset of mental illness. Business managers should not just look away when a case begins to develop. Instead, they should show concern for their employee's welfare by talking to them in private at an early stage and, if required, telling them about the available treatments. Occupational health care professionals have a major role to play as the interface between the workplace and psychosocial treatment services. Targeted management training workshops providing basic skills for responding to mental illness and practice-based training for handling these sensitive conversations using tried-and-trusted guidelines have been proven to work very well at a number of companies.

It is recommended to refrain from giving well-intentioned but inexpert advice such as "Take a few days off". Neither should (suspected) diagnoses or recommended treatments be expressed, as this is not the responsibility of business managers. Of prime importance in the company's interest is that the performance of the employee in question return to normal levels. Good managers should have the appropriate skills to handle sensitive conversations, such as active listening, displaying sympathy, and focusing on the key issues arising from the conversations. By meeting their duty of care, and by informing employees confidentially of the professional treatment available (if appropriate), managers can avoid long periods of presenteeism with reduced performance and long absences on sick leave. It does not need to be explained that this goes hand in hand with an enormous potential to save money, and that a clearly defined policy will benefit both management and the team (Fig. 7).

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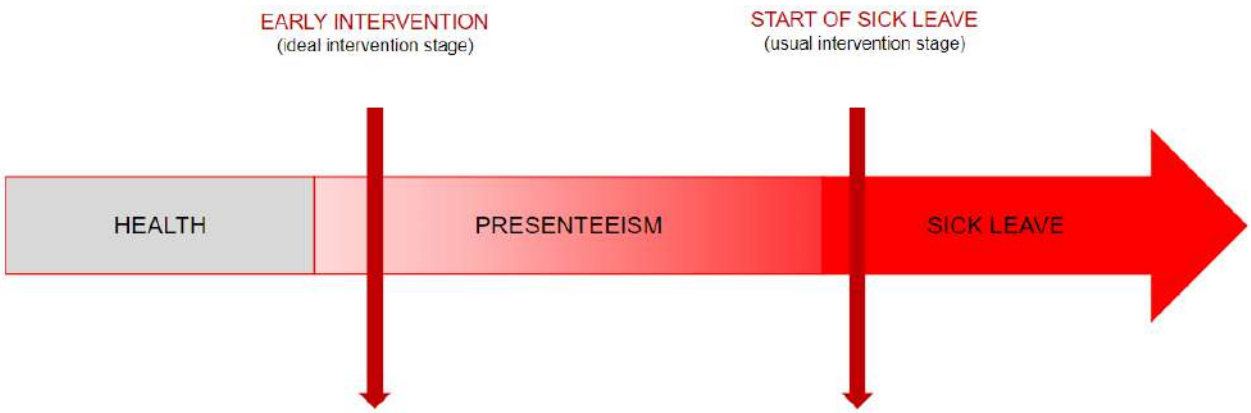


Figure 7: Early intervention. (© M. Fischl)

Tertiary prevention (rehabilitation)

In addition to the pre-existing rehabilitation services for mental illness, the introduction of a law in Austria regulating part-time work during reintegration (known as WIETZ) [12] on 1 July 2017 represented another major step forward in tertiary prevention. It gives employees the opportunity to ease themselves back into working routines when returning from lengthy sick leave absences.

After long-term sick leave (defined as at least six weeks), working hours can be reduced by up to 50% when returning to a professional environment before gradually being increased until the employee can perform at full capacity. WIETZ stipulates that this readjustment period can last between one and six months, though if required it can be extended by a further three months. In addition to receiving proportionate pay from their employer, the employee also receives a reintegration allowance funded by health insurance.

Although WIETZ does not obligate employers in Austria to offer a Company Integration Management (CIM) program, companies in Germany have been legally required to do so since 2004 (CIM in section 167 subsection 2 of Volume 9 of the German Social Insurance Code). German employers must offer a CIM program to all employees who within one year are unable to work for an uninterrupted period of longer than six weeks, or who are repeatedly unable to work. As this legal requirement results in clear structural benefits for the implementation and procedure of a CIM program, 18 companies in Upper Austria, with 24,000 employees in total, have agreed to voluntarily adopt this requirement in line with the German model (CIM Network Austria) [13].

A large study and research report (known as EIBE 2) conducted on behalf of the German Federal Ministry of Labour and Social Affairs has also made a compelling case for the economic and business benefits of a CIM program, demonstrating a return on investment (ROI) of 1:4.81. In other words, each euro invested leads to a future saving of 4.81 euros [14].

CIM is a key tool for preventing employee absence due to sick leave, which is particularly important when there is a shortage of specialists in the workforce, so it pays off for an employer to offer CIM to its employees. And for the employees themselves, CIM (which is always voluntary) can help prevent unemployment or the need to draw an incapacity pension [15] (Fig. 8).

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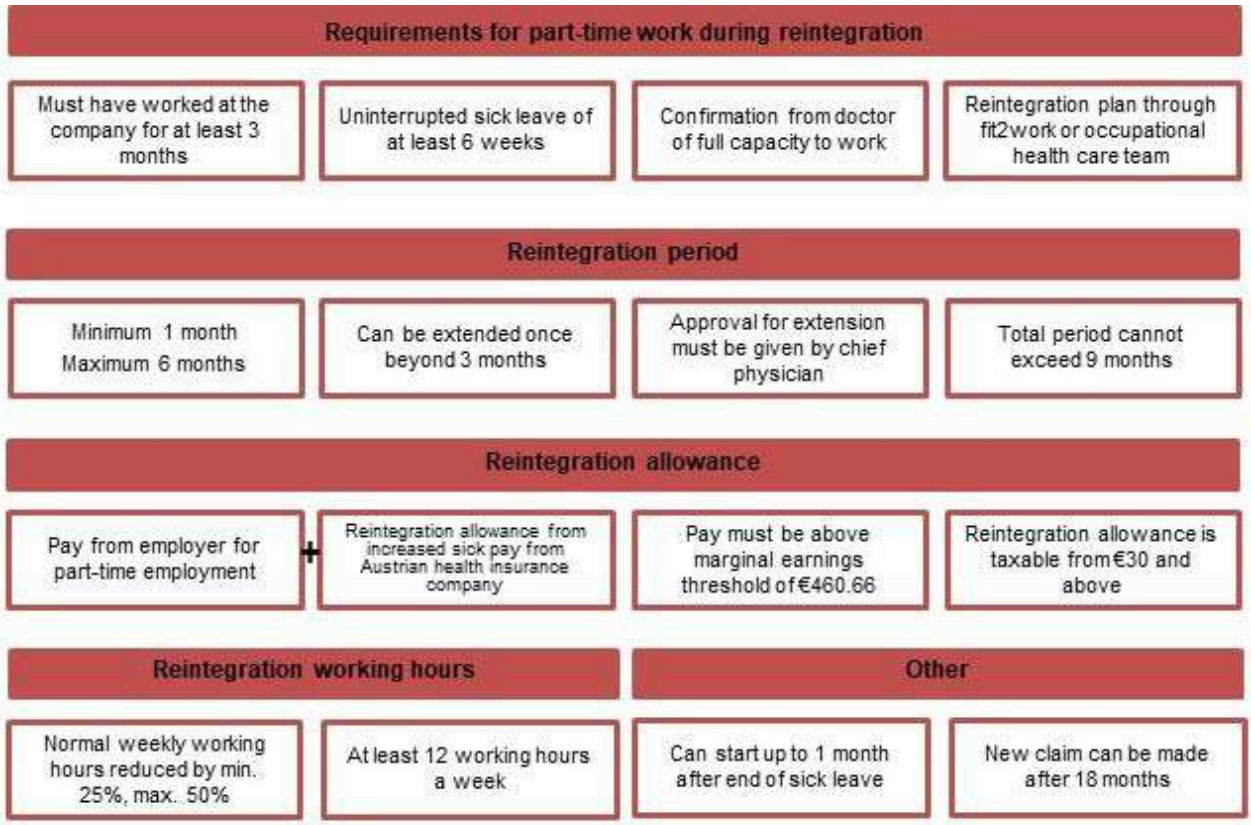


Figure 8: Legal requirements for part-time work during reintegration (as per WIETZ). (© M. Fischl)

In this context, mention should also be made of a synthesis of systematic reviews of databases from between 2000 and 2012 to determine the level of evidence for mental health interventions in the workplace [16]. The search resulted in 3363 titles, of which 14 were eventually found to meet the inclusion criteria and were summarized in the synthesis. The synthesis reported on workplace mental health interventions that impacted absenteeism, productivity, and financial outcomes. It concluded that there is positive evidence for the effectiveness of workplace mental health interventions (in particular multicomponent mental health and/or psychosocial interventions and exposure in vivo containing interventions for particular anxiety disorders). The authors also stated, however, that due to the complexity of the issue further research was required in order to provide clear guidance for business managers on the best workplace mental health interventions [16].

IV. The Role of Psychiatrists in Reintegration

As psychiatrists, we can make our patients aware that WIETZ can help. The occupational health care professional is their first port of call at work, and they can work with the patient to develop a reintegration plan. If the company does not have an occupational health care professional, patients can use the "fit2work" program (Fig. 9).

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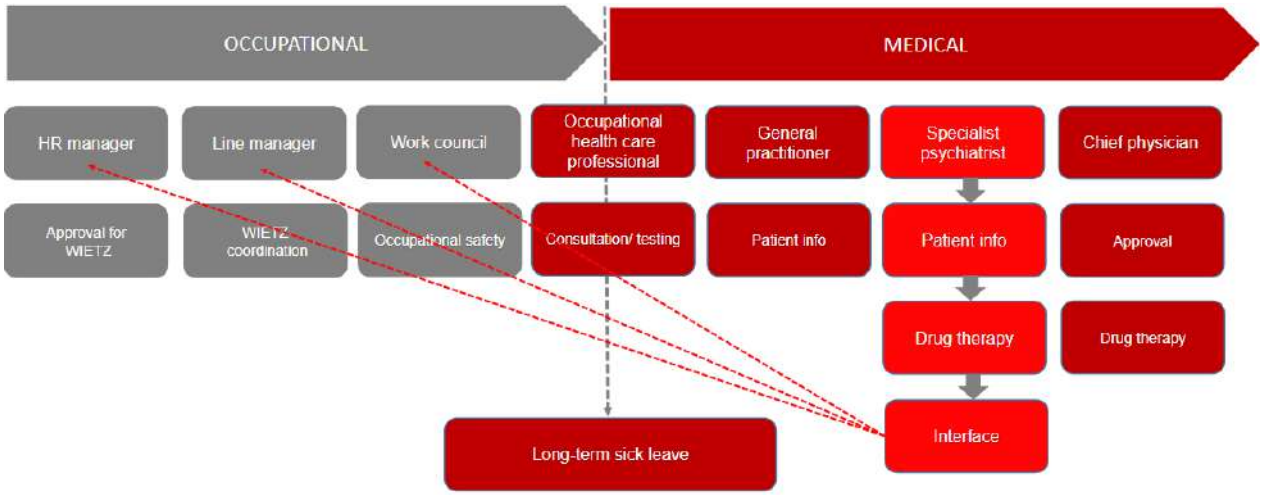


Figure 9: The psychiatrist's role. (© M. Fischl)

a) Example of successful reintegration

A manager from the IT sector with diagnosed moderate depression and burnout syndrome was on sick leave for three months, during which time he was treated as an outpatient at our hospital with both drug therapies and additive non-drug therapies. Although his concentration levels and resilience in particular remained limited, he was informed at an early stage of the possibility of part-time work as part of his reintegration.

After consulting with contact persons at his company, such as the occupational health care professional and his HR manager, the company approved this step and agreed a period of part-time work of five months to aid his reintegration. This meant he could be eased back in by gradually increasing his workload, which proved to be extremely beneficial for his rehabilitation. On the patient's request, the company was also able to involve the HR manager to discuss various strategies for tailoring his workload to his levels of resilience.

Reintegration was viewed as a process which required continuous monitoring and support. To this end, short weekly feedback conversations were arranged with the HR manager over the first few months to review the effectiveness of the agreed steps. The employee is now fully recovered and performing at normal levels.

Conflicts of Interest

None

References Références Referencias

1. OECD. Fit Mind, Fit Job: From Evidence to Practice in Mental Health and Work. OECD Publishing, Paris. https://read.oecd-ilibrary.org/employment/fit-mind-fit-job_9789264228283-en#page4 [September 05, 2019]
2. Leoni T. Fehlzeitenreport 2019: Krankheits- und unfallbedingte Fehlzeiten in Österreich – Die flexible Arbeitswelt: Arbeitszeit und Gesundheit. https://www.sozialversicherung.at/cdscontent/load?contentid=10008.728012&version=1575389997 [August 14, 2020]
3. Austrian pension insurance institution. Jahresbericht der Pensionsversicherungsanstalt 2019. https://www.pensionsversicherung.at/cdscontent/load?contentid=10008.678442&version=1564738304 [August 14, 2020]
4. Leoni T, Böheim R. Fehlzeitenreport 2018: Krankheits- und unfallbedingte Fehlzeiten in Österreich– Präsentismus und Absentismus. https://www.sozialversicherung.at/cdscontent/load?contentid=10008.713305&version=1543824555 [August 14, 2020]
5. OECD. Gesundheit auf einen Blick: Hohe Kosten durch psychische Erkrankungen in Europa. https://www.oecd.org/berlin/presse/hohe-kosten-durch-psychische-erkrankungen-in-europa-22112018.htm [September 05, 2019]
6. Leka S, Nicholson PJ. Mental health in the workplace. Occup Med 2019; 69: 5–6.
7. Riechert I. Psychische Störungen bei Mitarbeitern: Ein Leitfaden für Führungskräfte und Personal verant wortliche – von der Prävention bis zur Wiedereingliederung. 2nd ed. Springer, Berlin Heidelberg; 2015.
8. Berger M, Hecht H, Al-Shajlawi A (Eds). Psychische Erkrankungen: Klinik und Therapie; unter systematischer Berücksichtigung von Übersichtsarbeiten der Cochrane-Collaboration und des Centre for Reviews and Dissemination. Additional electronic chapter "Stigma". 2nd ed. Elsevier Urban & Fischer, Munich; 2004.
9. Fuchs T, Bielenski H (Eds). Was ist gute Arbeit? Anforderungen aus der Sicht von Erwerbstätigen; Konzeption und Auswertung einer repräsentativen Untersuchung. 2nd ed. NW - Verl. für neue Wissenschaft, Bremerhaven; 2006.

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10. Nicholson PJ. Common mental disorders and work. Br Med Bull 2018; 126: 113–21.
11. Mendel R, Hamann J, Kissling W. Vom Tabu zum Kostenfaktor– warum die Psyche plötzlich ein Thema für Unternehmen ist. Wirtschaftspsychologie aktuell 2010; 27.
12. Austrian Federal Ministry of Labour, Social Affairs, Health and Consumer Protection. Wiedereing liederungsteilzeitgesetz: Arbeitsrechtlicher und sozialversicherungsrechtlicher Leitfaden. https://broschuerenservice.sozialministerium.at/Home/Download?publicationId=407 [September 05, 2019]
13. Betriebs service. http://bem.betriebsservice.info/start/?no_cache=1 [September 06, 2019]
14. German Federal Ministry of Labour and Social Affairs. EIBE: EIBE 2 – Entwicklung und Integration eines betrieblichen Eingliederungsmanagements. https://www.bmas.de/SharedDocs/Downloads/DE/PDF-Publikationen/fb-fc401-eibe-projektbericht.pdf;jsessionid=C00E46A3D1DE4DD7BA244E8647747516?__blob=publicationFile&v=2 [September 06, 2019]
15. German Federal Ministry of Labour and Social Affairs. Betriebliches Eingliederungsmanagement: Von der Arbeitsunfähigkeit zur Beschäftigungsfähigkeit. https://www.bmas.de/DE/Themen/Arbeitsschutz/Gesundheit-am-Arbeitsplatz/betriebliches-eingliederungs-management.html [September 06, 2019]
16. Wagner SL, Koehn C, White MI, Harder HG, Schultz IZ, Williams-Whitt K et al. Mental health interventions in the workplace and work outcomes: a best-evidence synthesis of systematic reviews. Int J Occup Environ Med 2016; 7: 1–14.

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Identification of Brain Structures Involved in Lower Urinary Tract Symptoms and Sexual Dysfunctions in Patients with Multiple Sclerosis

By Riccardo Bientinesi, Marco Campetella, Viviana Nociti,
PierFrancesco Bassi & Emilio Sacco

Catholic University of Sacred Heart

Abstract- Multiple sclerosis is an autoimmune progressive neurological disease with a diverse range of urological symptomatology, since most MS patients experience one or more moderate to severe urinary symptoms, as well as bladder and/or sexual disorders. Urologists play the director's role in evaluating and treating these patients. Therefore, identifying and understanding the central neural processes involved in specific parts of micturition in patients with neurogenic lower urinary tract dysfunction may identify areas of interest for future intervention.

GJMR-A Classification: NLMC Code: WL 348

IDENTIFICATIONOFBRAINSTRUCTURESINVOLVEDINLOWERURINARYTRACTSYMPTOMSANDSEXUALDYSFUNCTIONSINPATIENTSWITHMULTIPLESCLEROSIS

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Identification of Brain Structures Involved in Lower Urinary Tract Symptoms and Sexual Dysfunctions in Patients with Multiple Sclerosis

Riccardo Bientinesi [α], Marco Campetella [σ], Viviana Nociti [ρ], PierFrancesco Bassi [ω] & Emilio Sacco [¥]

Abstract- **Multiple sclerosis is an autoimmune progressive neurological disease with a diverse range of urological symptomatology, since most MS patients experience one or more moderate to severe urinary symptoms, as well as bladder and/or sexual disorders. Urologists play the director's role in evaluating and treating these patients. Therefore, identifying and understanding the central neural processes involved in specific parts of micturition in patients with neurogenic lower urinary tract dysfunction may identify areas of interest for future intervention.**

I. Introduction

Multiple sclerosis (MS), which is the most frequently occurring progressive neurological autoimmune disease in young people, can affect any part of the central nervous system (CNS). The lifetime prevalence of MS is roughly 250 per 100,000 people [1]; MS is commonly diagnosed in younger adults (20–40 years) and affects females 3–4 times more often than males. It has been reported that lower urinary tract dysfunction occurs in the first 18 years after disease onset in up to 90% of MS patients [2, 3]. In the 2005 North American Research Committee on Multiple Sclerosis (NARCOMS) survey of almost 10,000 patients with MS, 65% of participants reported experiencing one or more moderate to severe urinary symptoms, as well as bladder and sexual disorders [4]. In MS patients, lower urinary tract symptoms (LUTS) occur on a spectrum of severity, ranging from urgency to urge urinary incontinence, potentially accompanied by incomplete bladder emptying and/or hesitancy. The severity of LUTS and their presentation may show considerable variation among MS patients as a result of the multifocal and diffuse involvement of the CNS. Roughly 70% of MS patients indicated that they experienced a moderate or severe impact on their quality of life as a result of LUTS [5]. Furthermore, in addition to the serious impact of LUTS on the quality of life of MS patients, LUTS also pose an elevated risk for upper urinary tract integrity [6]. In diagnostic evaluations of patients with MS, the most frequently observed urological findings are urgency, frequency and neurogenic detrusor over activity (NDO) (34–99%) [7].

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II. Objectives

This study was conducted to review and summarize data on neurologic lower urinary tract disorders, sexual dysfunctions and their correlation with brain and brainstem lesions in patients with MS.

III. Methods

A literature review (PubMed, Web of Science, and Scopus) was conducted for articles on urological and sexual dysfunction in MS patients and their correlation with brain and brainstem alterations.

IV. Neural Pathways of Micturition

Until the age of 3 to 5 years, the micturition occurs involuntarily in infants and in young children. After this age, the development of the system controlling the micturition is complete and mature. In CNS, there are many areas and pathways involved in this process, and they are strictly connected to tracts in the spinal cord. These circuits coordinate the activity of the smooth and striated muscle of the bladder and the tone of the sphincter, allowing the storage and the elimination of urine. The coordination is mediated by a complex neural system that is located in the brain, in the spinal cord and in the peripheral ganglia. [8]. The bladder has only two modes of operation: storage and elimination. Both modalities involve a pattern of afferent and efferent signaling in *parasympathetic* (pelvic nerves), *sympathetic* (hypogastric nerves) and *somatic* (pudendal nerves) pathways. These bring to the formation of reflexes, which can keep the bladder relaxed with a low intravesical pressure, or can initiate the contraction of the detrusor to allow bladder emptying. [9]. The parasympathetic pathways mediate the relaxation of the urinary sphincter and the contraction of the detrusor. Preganglionic neurons are located in the lateral part of the sacral (S2-S4) intermediate gray matter (also called *sacral*

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parasympathetic nucleus). The postaganglionic neurons are located both in the pelvic plexus and in the detrusor wall layer. [10]. Sympathetic pathways mediate the relaxation of detrusor muscle and the contraction of the bladder outlet region and urethra. The preganglionic neurons are located in the intermediolateral nuclei of T10-L2 of the spinal cord. The axons follow a complex route through the sympathetic chain ganglia, the inferior mesenteric ganglia, ending through the hypogastric nerves to the pelvic ganglia. [11]. The motoneurons controlling the activity of external urinary sphincter (EUS) are located in the lateral border of the ventral horn, commonly names as the *Onuf nucleus*. The somatic innervation is provided by the pudendal nerve [12]. The afferent pathways moves from periphery through the pelvic nerves to the dorsal root ganglia at the lumbosacral level of the spinal cord, but some fibers travel from periphery to the spinal cord through the hypogastric nerve [13]. The most important informations come from receptors of the bladder wall, which travel along those routes and are activated when the intravesical pressure overcomes a certain threshold (5-15 mmH2O, first sensation of bladder filling). There are also smaller fibers which are "silent", but are activated following chemical irritation to the bladder mucosa. Recent evidences suggests that the urothelium itself can serve as an important signaling unit, producing a big variety of biochemical mediators [14]. Bladder filling is mediated by a *sympathetic storage reflex* and a *somatic storage reflex*, with the purpose to relax the bladder and to contract the EUS. As the bladder distends, afferent fibers travel informations through the pelvic nerves to the spinal cord, activating a sympathetic response (L1-L3) and a consequent decrease in parasympathetic activity. The predominant innervation of the human bladder from sympathetic fibers is in the outlet region, where it mediates contraction. Pelvic nerves driving impulses to the spinal cord activate also neurons in the nucleus of Onuf, activating a response through the pudendal nerve ending in the contraction of the EUS. In addition to this, there is also a supraspinal imput to the nucleus of Onuf, responsible of the voluntary control of the EUS [15]. When the bladder is very full and the impulsis from the afferent fibers arise, they are brought also to more rostral areas of the spinal cord, and to the brain. The periacqueductal gray (PAG) in the rostral brain stem integrates information from afferent fibers and from the cerebral cortex, and is strictly connected to the Pontine micturition center (PMC), which also controls the pathway of the micturition reflex. When the afferent activity overcomes a certain threshold, PMC activity increases and activates the parasympathetic pathways, determining the activation of the detrusor and the relaxation of the EUS, performing micturition [8]. Summing up, in adults, micturition depends on a long-loop spinobulbo-spinal reflex. During the filling phase, that usually occupies at least 99% of the time, afferent signals from the bladder and urethra ascend through the spinal cord to synapse in the midbrain periaqueductal gray (PAG). Their intensity increases as the bladder is filled. If the reflex operated automatically, then it would be triggered when afferent input exceeded a certain threshold; fibers descending from the PAG would then excite the pontine micturition center (PMC); PMC excitation activates descending motor efferents, which are hard-wired to cause coordinated urethral sphincter relaxation and bladder contraction; thus the system would enter the voiding phase and empty the bladder. However, automatic triggering of the reflex implies involuntary voiding (incontinence). Normally therefore the reflex is inhibited [16].

V. Urological Disorders in Multiple Sclerosis

Bladder dysfunction is the most frequently encountered disturbance of the autonomic nervous system in MS, but in many cases, it is inadequately diagnosed and insufficiently treated. According to a systemic review of recent articles presenting the findings of urodynamic studies in MS patients (12 studies, 1524 patients), 53% of MS patients had detrusor overactivity (DO), 43% had detrusor sphincter dyssynergia (DSD), and 12% had atonic bladder. Magnetic resonance imaging (MRI) studies of MS patients have suggested an association between MS lesions in the corticospinal tract with progressive lower urinary tract bother, hesitancy, and urgency or frequency [8]. Cervical lesions are often linked to the presence of DSD [17]. Furthermore, urinary incontinence and weak stream have shown associations with lesions in the cerebellum and pons [18]. Over the course of disease progression, it is necessary to reassess MS patients in order to adjust their therapies. In many patients, conservative and pharmacological therapies show diminishing effectiveness, which may be due to the cumulative impact of physiological, cognitive, and physical changes over the course of MS. For this reason, it is important to regularly change treatment regimens of MS patients for urological safety and to promote their quality of life. If conservative and pharmacological treatments become ineffective, it is important for both physicians and patients to understand the benefits, risks, and outcomes of secondary and tertiary treatments for LUTS related to MS.

Sexual dysfunctions (SDs) are also widespread among MS patients, although their prevalence is frequently underestimated and they may have a remarkably strong effect on patients' quality of life. SDs have been reported to be present in 50–90% of MS patients [19, 20].

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VI. Neural Alterations in Overactive Bladder and Urinary Urge Incontinence

Urgency, frequency, and neurogenic detrusor overactivity are the most common urological symptoms in patients with neurogenic disorders like multiple sclerosis (MS), Parkinson's disease, spinal cord injuries, or ischemic stroke. Dysfunctional voiding occurs in 34% to 79% of the patients [21]. There seem to be three separate regimes. Firstly, at small bladder volumes when sensation is mild, responses show abnormal deactivation of limbic regions, perhaps to suppress unwanted emotional reaction. Secondly, at large bladder volumes with strong sensation but in the absence of DO, responses are exaggerated, representing recruitment of acces-sory pathways to maintain bladder control and/or increased bladder awareness. Finally, if bladder control is lost, signified by the onset of DO, then there seems to be a third pattern of responses, including deactivation of the prefrontal cortex, that may indicate inability to maintain voluntary control of voiding [16]. In individuals with proven urge incontinence and DO, brain responses to bladder filling at small bladder volumes (with relatively mild sensation and no DO) differ from normal. A considerable part of the limbic (emotional) system shows deactivation with bladder infusion, including hippocampus, parahippocampal gyrus and possibly amygdala, together with adjacent inferior temporal lobes, medial orbito-frontal cortex, and parts of the posterior cortex. Such extensive deactivations were not seen in normals (significant difference between groups, $P<0.01$ uncorrected), the location of deactivations in the limbic system may imply that urge-incontinent individuals suppress unwanted emotional reactions aroused by bladder infusion, even when there is no urgency and no DO. Such suppression might be a conditioned reaction to bladder filling, formed by previous negative experiences of loss of bladder control [16].

Other striking differences between brain responses in urge-incontinent and normal subjects occur at larger bladder volumes, after subjects have signaled strong desire to void orurgency (but there is no DO or incontinence). Firstly, urge-incontinent subjects show significantly stronger and more extensive activation of the brain globally, especially in the ACG, part of the limbic (emotional) nervous system. Secondly, they exhibit significantly stronger activation in accessory areas that include frontoparietal regions involved in pelvic-floor motor activity and the lateral somatomotor cortex identified by Critchley et al, a region that supports interoceptive awareness. Together, these changes suggest abnormally strong emotional arousal induced by bladder filling, and an attempt to recruit accessory pathways in order to maintain control of pelvic-floor muscles and inhibition of the PMC (and the voiding reflex) when loss of bladder control threatens. In DO patients, the presence of DO was associated with marked decrease in activation of the prefrontal cortex bilaterally andparts of the limbic system (right parahippocampal gyrus/amygdala). There was no significant change in the activation of ACG or orbitofrontal cortex. This pattern of changes suggests a lack of voluntary control of the bladder with ongoing arousal [16, 17].

Urgency is a key characteristic of urge incontinence. It is an abnormal sensation characterized by a compelling natureand pronounced emotional content, as indicated by currentand past definitions: ''a sudden compelling desire to void thatis difficult to defer'', associated with ''fear of leakage.''[16, 17]

Many data suggest that there may be a dysfunction of the prefrontal cortex in urge-incontinent subjects, either weaker activation of orbitofrontal cortex or deactivation of medial frontal cortex. Because the prefrontal cortex is associated with decision-making in a social context and is involved in voiding, it is plausible that dysfunction of this region could be a cause of incontinence. The dysfunction could be caused either by a regional defect or by disruption of connecting pathways. In urge-incontinent subjects, brain responses to bladder filling differ from normal at both small and large bladder volumes, even in the absence of DO. Weak response or deactivation observed in the prefrontal cortex or the limbic system may represent intrinsic defects of supraspinal bladder control that cause urge incontinence. Exaggerated ACG response at large bladder volumes apparently represents a learned reaction to imminent loss of control that originates elsewhere in the brain or is due to abnormal bladder afferents. It may be the neural correlate of the abnormal sensation called urgency. If actual DO develops then the prefrontal cortex seems to become deactivated, consistent with the loss of voluntary bladder control. Different causes or combinations of causes may be responsible for urge incontinence in different individuals, implying that there are different phenotypes that may require different treatments. Understanding of these differences and their causes, based on functional brain imaging, promises to bring about the next great advance in diagnosis and therapy of this difficult problem [16, 17].

VII. Neural Alterations in Detrusor-Sphincter Dyssynergia

Detrusor sphincter dyssynergia (DSD) is a very frequently found problem in patients with neurological diseases. In fact, it is commonly seen in patients with SCI and MS but there seem not to be clear relationship to type of DSD and severity of the neurological condition. Residual urine volume and thus secondary

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UTIs onset with the risk of kidney damage is currently a problem. DSD is defined as a rise of muscle activity in the pelvic floor electromyography during relaxation of the pelvic floor, showing that the urethral sphincter muscle contracts, instead of relaxing completely during initiation of voiding. Khavari et al [22] have demonstrated in subjects with MS and DSD that the patients show lower, more diffuse activation than the healthy volunteers. Furthermore, patients who demonstrated NDO tended to have more activation in the areas associated with executive function (bilateral middle and right inferior frontal gyrus) and the brainstem than the group without NDO. Additionally, the right inferior frontal gyrus, which is implicated in risk aversion, is more activated in patients with NDO, which could be explained as an inhibition signal to accept a risky option of urinary incontinence [23]. About patients with DSD, this small subgroup expressed a trend toward greater activation in areas of executive function, emotional processing, movement (right caudate) and the brainstem (each $p < 0.01$) [22]. Interestingly, the caudate nucleus, one of the structures in the basal ganglia that has been long associated with motor processes because of its role in Parkinson's disease, is also significantly activated in this group at the time of DSD. This reaction could possibly be explained by the learned behavior that these patients may require to initiate more abdominal straining and Valsalva maneuvers to begin to void due to higher bladder outlet resistance.

A recent study from Sandra Seseke et al [24] demonstrated some differences between DSD patients and healthy controls in fMRI. Surprisingly, the pontine region showed a completely different activation site in the group activation map of the patients. The activation was detected in the more rostral/dorsal part in the DSD group. It could be explained by a stronger activation of the pontine L-region as the patients have to try harder to initiate the micturition and the urethral sphincter is inhibited as functional brain studies of Blok et al [25] and Nour et al [26] elucidated. In a recent study of Keller et al [27] using an animal model, neurons in the PMC expressing estrogen receptor 1 were identified, which are responsible for bladder contraction and relaxation of the urethral sphincter, whereas the other subset of neurons found, expressing corticotropin-releasing hormone, only increased the bladder pressure. The study could show that molecularly and functionally distinct cell groups may play a role in the subcortical regulation of micturition. In human, further studies with larger samples have to clarify the location differences in functional mapping of the pontine regions.

VIII. Neural Alterations in IPO- and Acontractile Bladder

A wide range of neurologic injures or neurologic diseases can lead to detrusor under activity (DUA). This dysfunctions may involve the brain, the spinal cord or the peripheral nerves, in both their afferent and efferent component [28]. In the brain, the pontine micturition center (PMC) receives many imputs from the cerebral cortex, in particular from the limbic system. Many areas, like the insula, hypothalamus and the periaqueductal gray help integrating all the stimuli, resulting in the activation of micturition pathways. Any lesion in one of those regions, for example, secondary to MS plaques, may potentially lead to DUA, even if there is not always a direct correlation between the neurologic lesion in the brain and the urological dysfunction [29]. Overall, DUA may occur in up to 20% of patients affected by MS, but in particular if neurological lesions affect the lumbosacral cord instead of the brain [30]. In Parkinson's disease or after a cerebrovascular accident overactive bladder is the most common sequela, but in the acute period about 50% of the patients may develop acute urinary retention, due to the "cerebral shock" [31]. About peripheral innervation, injures at the level of lumbosacral cord, the cauda equina and the sacral and pelvic nerves can lead to DUA. This may occur as the result of a trauma, a disease of the vertebral column or after radical pelvic surgery. An interruption or impairment of efferent signaling in the sacral cord (segments S2-S4), sacral roots or pelvic nerves can present with reduced or absent detrusor contraction [32]. In a systematic review [33], the overall incidence of LUT dysfunctions after radical hysterectomy was 72%, and high incidences of DUA were reported also in older series of patients undergoing radical rectal surgery. An impairment in afferent function (from the bladder or the urethra) can potentially reduce or delete the micturition reflex, leading to partial or total loss of voiding efficiency. Also normal aging is associated with a decline in sensory function in the lower urinary tract [34]. Without intact bladder sensation, correct functioning of the efferent limb of the micturition reflex is compromised. Also urethral afferents have an important role in the perception of the detrusor contraction and the flow through the urethra [35].

IX. Neural Alterations in Sexual Dysfunctions

Sexual dysfunctions (SDs) are often found, but frequently underestimated, in patients with MS, and may have a remarkably high impact on patients' quality of life (QoL) [36]. In the past, MS-associated ED was thought to be the result mainly from MS lesions in the spinal cord [36]. More recently, functional neuroimaging in healthy men identified a network of brain areas, such as

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the insula, visual and somatosensory association areas, cingulate gyrus, prefrontal cortex, as well as subcortical regions, contributing to erectyle function (EF). Basing on these assumptions, Winder and coll. conduced a retrospective study [37] assessing the cerebral lesion pattern of male MS patients and correlating them with clinical scores of EF with the MS-associated lesion sites using voxel-based lesion symptom mapping (VLSM) [38, 39]. Study results demonstrated, in summary, how decreasing DeltaIIEF5 scores correlated with a large cluster of MS lesions in the insular region including the adjacent juxtacortical white matter, most prominently in the left-hemispheric insular region. Authors hypothesized that MS lesions in the left insular region could compromise parasympathetic modulation and thereby contribute to ED. Similar results were found in a study by Winder and coll. [39]; in this study, designed in order to determine associations between alterations of female sexual arousal as well as vaginal lubrication and the site of cerebral MS lesions, authors found that, in 44 MS women, decreased lubrication scores were associated with bladder or urinary symptoms and, as shown by multivariate VLSM analysis (including arousal and lubrication scores as covariables of interest) right occipital lesions were associated with impaired arousal and left insular lesions were associated with decreased lubrication. Moreover, impaired lubrication remained associated with left insular lesions after adjustment for bladder or urinary dysfunction. Surprisingly, in this MS patients series, dysfunction of sexual arousability or lubrication was not associated with patient age, disease duration or severity, spinal cord involvement, or depression.

In contrast with previous evidences, Zorzon et al. in their study did not find any association between SDs and MS lesions in the aforementioned regions [40]; on the other hand, Zivadinov and coll. applied a multivariate regression analysis, finding associations between SDs and pontine MS lesions [41]. Furthermore, Barak et al. found correlations between male and female anorgasmia and the total volume of cerebral MS lesions, and more specifically of brainstem and corticospinal tract lesions [42].

In a recent study investigating the frequency of SD in female MS patients and exploring its association with the location and number of demyelinating lesions, Solmaz and coll. [43] evaluated 42 female patients compared with 41 healthy subjects. All patients underwent neurological examination and 1.5 T brain and full spinal MRI. Results showed as MS patients had a statistically significantly lower FSFI and SF-36 scores and higher BDI and BAI scores compared with healthy subjects, but SDs seemed to be unrelated to the location and number of demyelinating lesions. These findings highlight the importance of the assessment and treatment of psychiatric comorbidities, such as depression and anxiety, in MS patients reporting SD, as reported in previous studies [44].

Finally, in 32 female and 9 male MS patients, Barak et al reported that anorgasmia correlated with the total volume of MS lesions throughout the brain and, more specifically, with MS lesions in the brainstem and corticospinal tract [42].

X. Conclusions

Lower urinary tract symptoms are very common in multiple sclerosis patients and adversely affect this patient's quality of life. Many neural pathways are involved in the pathogenesys of these symptoms and, due to the heterogeneity of neurologic lesions, symptoms are different from patient to patient. To face better this urological dysfunctions, the urologist needs to have a deep knowledge of their pathogenesis, allowing an improved management and a long-term follow-up of the patient, that often requires also a multidisciplinary approach. In addition, urologists must have consciousness of sexual dysfunctions in this patients, to investigate and treat this conditions in the best way possible.

XI. Disclosures

Authors declare no conflict of interest and no fundings

Research did not involve Human Participants and/or Animals and therefore there is no informed consent.

References Références Referencias

1. Compston A, Coles A. Multiple sclerosis. Lancet. 2002 Apr 6; 359(9313):1221-31. Review. Erratum in: Lancet 2002 Aug 24; 360(9333):648.
2. de Sèze M, Ruffion A, Denys P, et al. The neurogenic bladder in multiple sclerosis: review of the literature and proposal of management guidelines. Mult Scler. 2007 Aug; 13(7):915-8.
3. Phé V, Chartier-Kastler E, Panicker JN. Management of neurogenic bladder in patients with multiple sclerosis. Nat Rev Urol 2016; 13:275–88.
4. Mahajan ST, Patel PB, Marrie RA. Under treatment of overactive bladder symptoms in patients with multiple sclerosis: an ancillary analysis of the NARCOMS Patient Registry. J Urol. 2010 Apr; 183(4):1432-7.
5. Fowler CJ, Panicker JN, Drake M, et al. A UK consensus on the management of the bladder in multiple sclerosis. J Neurol Neurosurg Psychiatry. 2009 May; 80(5):470-7.
6. Lemack GE, Hawker K, Frohman E. Incidence of upper tract abnormalities in patients with neurovesical dysfunction secondary to multiple sclerosis: analysis of risk factors at initial urologic evaluation. Urology. 2005 May; 65(5):854-7.

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7. Wein AJ, Dmochowski RR. Neuromuscular dysfunction of the lower urinary tract. In: Campbell-Walsh Urology. 11th Edition. US: Elsevier Health Science, 2016: 1761-1795.
8. Fowler CJ, Griffiths D, de Groat WC. The neural control of micturition. Nat Rev Neurosci, 2008 Jun; 9(6):453-66.
9. Birder L, de Groat WC, Mills I, et al. Neural control of the lower urinary tract: peripheral and spinal mechanisms. Neurourol Urodyn. 2010; 29(1): 128-39.
10. De Groat WC, Vizzard M A, Araki I. Spinal interneurons and preganglionic neurons in sacral autonomic reflex pathways. Prog Brain Res, 1996; 107:97-111.
11. De Groat WC, Yoshimura N. Anatomy and physiology of the lower urinary tract. Handb Clin Neurol. 2015; 130:61-108.
12. Shinkeigaku R. Neuropathology of Onuf's Nucleus. 1991 Dec;31(12):1281-5.
13. De Groat WC, Yoshimura N. Changes in afferent activity after spinal cord injury. Neururol Urodyn. 2010; 29(1):63-76.
14. Birder LA, de Groat WC. Mechanisms of disease: involvement of the urothelium in bladder dysfunction. Nat Clin Pract Urol. 2007 Jan; 4(1): 46-54.
15. Sugaya K, et al. Central nervous control of micturition and urine storage. J Smooth Muscle Res. 2005, Jun; 41(3):117-32.
16. Derek Griffiths, Stasa D Tadic. Bladder control, urgency, and urge incontinence: evidence from functional brain imaging. Neurourol Urodyn. 2008;27(6):466-74
17. Araki I, Matsui M, Ozawa K, et al. Relationship of bladder dysfunction to lesion site in multiple sclerosis. J Urol. 2003 Apr; 169(4):1384-7.
18. Weissbart SJ, Pechersky D, Malykhina A, et al. The impact of pontine disease on lower urinary tract symptoms in patients with multiple sclerosis. Neurourol Urodyn. 2017 Feb; 36(2):453-456.
19. Schmidt EZ, Hofmann P, Niederwieser G, et al. Sexuality in multiple sclerosis. J Neural Transm (Wien). 2005 Sep; 112(9):1201-11.
20. Tepavcevic DK, Kostic J, Basuroski ID, et al. The impact of sexual dysfunction on the quality of life measured by MSQoL-54 in patients with multiple sclerosis. Mult Scler. 2008 Sep; 14(8):1131-6.
21. Dillon BE, Lemack GE. Urodynamics in the evaluation of the patients with multiple sclerosis: when are they helpful and how do we use them. Urol Clin North Am. 2014; 41:439-444.
22. Khavari R, Karmonik C, Shy M. Functional Magnetic Resonance Imaging with Concurrent Urodynamic Testing Identifies Brain Structures Involved in Micturition Cycle in Patients with Multiple Sclerosis. J Urol. 2017 Feb; 197(2):438-444.
23. Christopoulos GI, Tobler PN, Bossaerts P, et al. Neural correlates of value, risk, and risk aversion contributing to decision making under risk. J Neurosci. 2009 Oct 7; 29(40):12574-83.
24. Seseke S, Leitsmann C, Hijazi S, et al. Functional MRI in patients with detrusor sphincter dyssynergia: Is the neural circuit affected? Neurourol Urodyn. 2019; 38: 2104-2111.
25. Blok B, Willemsen A, Holstege G. A PET study on brain control of micturition in humans. Brain. 1997; 120:111-121.
26. Nour S, Svarer C, Kristensen J, et al. Cerebral activation during micturition in normal men. Brain. 2000; 123:781-789.
27. Keller JA, Chen J, Simpson S, et al. Voluntary urination control by brainstem neurons that relax the urethral sphincter. Nat Neurosci. 2018; 21:229-1238.
28. Aizawa N, Igawa Y. Pathophysiology of the underactive bladder. Investig Clin Urol. 2017 Dec; 58:S82-S89.
29. Kim YH, Goodman C, Omessi E. The correlation of urodynamic findings with cranial magnetic resonance imaging findings in multiple sclerosis. J Urol. 1998 Mar; 159(3):972-6.
30. Litwiller SE, Frohman EM, Zimmern PE. Multiple sclerosis and the urologist. J Urol, 1999. Mar; 161(3):743-57.
31. Araki I, Kitahara M, Oida T, et al. Voiding dysfunction and Parkinson's disease: urodynamic abnormalities and urinary symptoms. J Urol, 2000. Nov; 164(5):1640-3.
32. Aizawa N, Igawa Y. Pathophysiology of the underactive bladder. Investig Clin Urol. 2017 Dec; 58:S82-S89.
33. Plotti F, Angioli R, Zullo MA et al. Update on urodynamic bladder dysfunctions after radical hysterectomy for cervical cancer. Crit Rev Oncol Hematol. 2011 Nov; 80(2):323-9.
34. Suskind AM, Smith PP. A new look at detrusor underactivity: impaired contractility versus afferent dysfunction. Curr Urol Rep. 2009 Sep; 10(5):347-51.
35. Bump RC. The urethodetrusor facilitative reflex in women: results of urethral perfusion studies. Am J Obstet Gynecol. 2000 Apr; 182(4):794-802.
36. Betts CD, Jones SJ, Fowler CG, et al. Erectile dysfunction in multiple sclerosis. Associated neurological and neurophysiological deficits, and treatment of the condition. Brain. 1994; 117 (Pt 6):1303–1310.
37. Winder K, Linker RA, Seifert F. Insular multiple sclerosis lesions are associated with erectile dysfunction. J Neurol. 2018 Apr; 265(4):783-792.
38. Rorden C, Karnath HO, Bonilha L. Improving lesion-symptom mapping. J Cogn Neurosci 2007; 19: 1081–1088.

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39. Winder K, Linker RA, Seifert F, et al. Neuroanatomic correlates of female sexual dysfunction in multiple sclerosis. Ann Neurol 2016;80:490–8.
40. Zorzon M, Zivadinov R, Locatelli L, et al. Correlation of sexual dysfunction and brain magnetic resonance imaging in multiple sclerosis. Mult Scler 2003;9:108–110.
41. Zivadinov R, Zorzon M, Locatelli L, et al. Sexual dysfunction in multiple sclerosis: a MRI, neurophysiological and urodynamic study. J Neurol Sci 2003; 210:73–76.
42. Barak Y, Achiron A, Elizur A, et al. Sexual dysfunction in relapsing-remitting multiple sclerosis: magnetic resonance imaging, clinical, and psychological correlates. J Psychiatry Neurosci 1996; 21:255–258.
43. Solmaz V, Ozlece HK, Him A. Evaluation of the association between sexual dysfunction and demyelinating plaque location and number in female multiple sclerosis patients. Neurol Res. 2018 Aug; 40(8):683-688.
44. Lundberg PO. Sexual dysfunction in female patients with multiple sclerosis. Int Rehabil Med. 1981; 3(1): 32-4.

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Where is the Frequent/Docking Site of Central Acute Vestibular Syndrome Caused by Intracerebral Hemorrhage?

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Abstract- *Objective:* The vestibular pathway from thalamus to cortex is still well unknown. The aim of this study was to assess the frequent/ docking sites of patients with acute vestibular syndrome (AVS) caused by acute intracerebral hemorrage(ICH).

Methods: All patients with ICH with AVS were admitted to the intensive care unit (ICU) and neurologic ward in Shuyang Hospital during 2014–2016. We prospectively collected and analyzed data on patients with ICH with AVS. The frequent sites of central AVS were assessed on head CT-confirmed ICH. While, the images docking test between thalamic vestibular station and homologous cortical vestibular organ was studied.

Keywords: *acute vestibular syndrome; acute intracerebral hemorrage; vertigo or dizziness; computerized tomography; vestibular pathway; posterolateral thalamus; posterior insular lobe.*

GJMR-A Classification: *NLMC Code: WL 340*



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Results: Among 1129 consecutive ICH cases, 70 patients (6.2%) had ICH with central AVS, and most patients with central AVS were caused by small ICH. The median age of patients was 63.5 years (range, 41 to 92). The frequent sites of central AVS in ICH patients was limited between the insular lobe (21.4%, 15/70) and posterolateral thalamus (17.1%, 12/70). Of them, the median volume of hematoma was 3.0 ml (range, 1.3-24.5), and the median GCS score was 14 (range, 8-15). 3 patients with posterolateral thalamic hemorrhage with AVS and 3 patients with posterior insular hemorrhage with AVS were successfully docked in zero distance. Whereas, 3 patients with posterolateral thalamic hemorrhage with AVS and 3 patients with parietal/temporal lobe hemorrhage with AVS did not connect successfully.

Conclusion: The frequent/docking sites of central AVS caused by acute ICH were localized between the posterolateral and posterior insular cortex, suggesting that this location has a distinct vestibular docking pathway.

Keywords: acute vestibular syndrome; acute intracerebral hemorrage; vertigo or dizziness; computerized tomography; vestibular pathway; posterolateral thalamus; posterior insular lobe.

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I. Introduction

Vertigo or dizziness is a global problem and it affects approximately 15% to over 20% of adults annually according to large population- based studies (1). Acute dizziness/vertigo is a symptom of vestibular dysfunction in brain. Thus, this syndrome is also known as acute vestibular syndrome (AVS), which is characterized by acute dizziness/vertigo, head-motion intolerance, gait unsteadiness, nausea/vomiting, nystagmus, and duration of 24 hours or more (2,3), even presenting with a transient AVS (lasting seconds to hours, occasionally days) (3,4). At any point along the vestibular pathway from the peripheral labyrinth to the central vestibular cortex, AVS may occur; the causes of AVS is divided into peripheral and central AVS (3).

Previous cases studies have described intracerebral hemorrhage (ICH) with acute vertigo or AVS (5,6). However, the frequent/ docking sites of acute ICH causing an AVS remain unknown. Head computerized tomography (CT) is commonly used as a diagnostic test for stroke with acute vertigo presentations(7). The importance of using head CT is facilitate an understanding of the precise anatomical location in the brain. The central AVS is mainly located in brainstem, cerebelum, thalamus, and cortex, but the vestibular pathway from thalamus to cortex is still well unknown. Therefore, our aim was to assess the frequent/docking sites of central AVS in acute ICH from a prospective head CT scan population.

II. Methods and Materials

a) Study settings

The study design was a prospective registered for all patients from the intensive care unit (ICU) and neurologic wards (stroke center) in the Affiliated Shuyang Hospital of Xuzhou Medical University in Northern China (January 1, 2014 through December 31, 2016). The frequent sites of central AVS were retrospectively assessed based on head CT (minority with MRI). The image docking test between thalamic vestibular station and homologous cortical vestibular organ was measured and studied. We selected the images of AVS patients with small thalamic hemorrhage

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as the carrier of the thalamus vestibule station, and selected the images of AVS patients with small insular or parietal/temporal hemorrhage as docking body (its cutting the horizontal line perpendicular to the edge of the hematoma, hematoma side image retention, docking with the ipsilateral craniofacial coincide). The study was approved by the local ethical committee on clinical research of the hospital, and written informed consent was obtained from the patients' families.

b) Patients and selection criteria

Based on the International Statistical Classification of Diseases 10th Revision (ICD-10) by the WHO (1994), we identified acute vertigo syndrome (H81.9) and central vertigo (H81.4), and we also identified patients who had acute spontaneous ICH (code I61). We retrospectively analyzed adult patients who were verified as having an acute ICH within a 3-year period from their emergency head CT scan on admission (exclusion: traumatic ICH or subarachnoid hemorrhage).

For the purposes of this study, the inclusion criteria of the central AVS due to acute ICH were as follows: ① initial rapid onset symptoms adapting AVS criteria (2-4); and ② acute ICH located in a cerebral vestibular structure or pathway confirmed by head CT on admission. We excluded patients with acute ICH without data in their medical records due to either death or moribundity within the first 24 hours. We also excluded acute ICH resulting from an underlying neoplasm or a hemorrhagic infarction.

We analyzed the CT data that were collected at the closest time following the onset of AVS. The ICH volume was calculated from the first CT scan using the a×b×c×0.5 method, as previously described (8).

c) Related definitions and Clinical assessment

A small ICH was diagnosed according to the following criteria (9): ① hemorrhagic volume <3 ml in the brainstem; ② hemorrhagic volume <5 ml in the cerebellar; ③ hematoma volume <10 ml in the thalamus or basal ganglia; and ④ hematoma volume <15 ml in the lobar.

Central AVS refers to a cause from impaired central vestibular pathways and/or lesion evidence from images of central vestibular pathways.

The hospital charts of all ICH patients with and without central AVS were reviewed by a senior author. This author compiled the clinical information about central AVS and other findings of neurological examination, including focal neurological symptoms/ signs, the bedside oculomotor examination (i.e., the head Impulse test, nystagmus assessment, and skew deviation), while also including the relationships of clinical outcomes with age, sex, days in the ICU, underlying disease, hematoma location, hematoma volume, accompanying intraventricular extension, NIHSS score, GCS score, and the onset-to-admission time.

d) Statistical analysis

The results from the data are expressed as mean ± standard deviation (SD) or median (IQR), and number (percentage) for qualitative values. The statistical analysis was conducted using SPSS version 17•0 (SPSS Inc., Chicago, IL, USA).

III. Results

A total of 1393 adult acute ICH patients who come from general intensive care unit (ICU, 427/628) and neurologic ward (702/765) were prospectively recruited. After application of the eligibility/ exclusion criteria, 1129 ICH patients were included in the present investigation (Figure 1). 70 patients (6.2%) with acute ICH with central AVS were confirmed by head CT. The mean age was 64.2±13.0 years old, and median age was 63.5 years (range, 41 to 92). Among them, there were 47 (67.1%) males and 23 (32.9%) females. The median time from the onset to the hospital admission was 6.5 hours. Clinical features of 70 patients with central AVS caused by acute ICH are shown in the Table 1.

Table.1: Characteristics of 70 patients with central AVS caused by acute ICH

Characteristics	Velue
Male, n. (%)	47(67.1)
Median age ,yr(range)	63.5(41-92)
Median time from onset to CT,h (range)	6.5(0.5-335)
Risk factors n. (%)	
Hypertension	55(78.6)
Cerebral amynoid angiopathy	9(12.9)
Diabetes mellitus	8(11.4)
Moyamoya disease	2(2.9)
Unknown	2(2.9)

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Prior ischemic stroke	11(15.7)
Prior ICH	4(5.7)
Prior cardiac disease	2(2.9)
Clinical characteristics:	
Insular lobe hemorrhage n(%)	15(21.4)
Thalamus hemorrhage n(%)	15(21.4)
Brain stem hemorrhage n(%)	10(14.3)
Cerebellar hemorrhage n(%)	12(17.1)
Premary intraventricular	3(4.3)
Other cerebral lobe hemorrhage n(%)	15(21.4)
Intraventricular extensio n(%)	15(21.4)
SBP, (mmHg, mean ±SD)	174.8±34.3
DBP, (mmHg, mean ±SD)	100.9±17.2
Transient AVS n. (%)	12(17.1)
Persistent AVS n. (%)	58(82.9)
Initial head-motion intolerance n. (%)	61(87.1)
Gait unsteadiness n(%)	52(74.3)
Vomiting or nausea n(%)	57(81.4)
Spontaneous nystagmus, n(%)	10(14.3)
Nystagmus after head impulse test, n(%)	12(17.1)
Nystagmus after ocular tilt test, n(%)	9(12.9)
Non vestibular sympoms n. (%)	
Hemiparesis	14(20.0)
Numbness of limbs	3(4.3)
Slurred speech	5(7.1)
Downward deviation of eyes,	5(7.1)
Loss of consciousnes	12(17.1)
Drowsiness	4(5.7)
Headache	6(8.6)
Hemianopsias	1(1.4)
Positive Babinski signs	13(18.6)
Admission median NIHSS score（range）	2(0-23)
Admission median GCS score（range）	14(8-15)
Mortality at 30 days, n(%)	8(11.4)

AVS=acute vertigo syndrome; ICH=intracerebral hemorrhage; SBP=systolic blood pressure, DBP= diastolic blood pressure, NIHSS= National institute of health stroke scale; GCS= Glasgow Coma Scale

Hypertension (78.6%, 55/70) was the most common risk factor of these patients, followed by cerebral amyloid angiopathy (12.9%, 9/70). Most patients with central AVS were caused by small ICH, the most frequent symptoms of patients were persistent AVS (82.9%, 58/70), while transient AVS only occurred in 17.1% of patients.

Sixty-one (87.1%) patients with rapid onset central AVS had head-motion intolerance. 57 (81.4%) patients had vomiting or nausea, 52 (74.3%) patients had unsteadiness, and only 31 (44.3%) patients had nystagmus. The imaging outcome of acute ICH with central AVS on CT is shown in Table 2.

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Table 2: Hemorrhage site and features of ICH causing central AVS (n=70)

Site of ICH	Cases N,(%)	Hematoma Volume, M(IQR)	GCS (mean±SD)	NIHSS (mean±SD)	Death
Thalamus	15(21.4)	4(2.5-7.5)	11.5±4.2	7.7±8.2	4
Insular lobe	15(21.4)	3(1.3-24.5)	14.7±0.8	1.8±3.3	0
Frontal lobe	3(4.3)	5.8(1.5-22.7)	14±1.4	3±2.8	0
Temporal lobe	2(2.9)	11.5(8-14.7)	11.0±5.7	12.0±15.6	0
Parietal lobe	6(8.6)	6(2-15.0)	15±0.0	2±1.7	0
Occipital lobe	4(5.7)	10(3.8-14.5)	12.5±5.0	6.3±9.2	1
Premaryintraventricular	3(4.3)	N/A	9±5.1	14.7±12.7	0
Brainstem	10(14.2)	2(1.5-3)	9±5.7	13.4±11.4	3
Cerebellum	12(17.1)	3.5(3-4.9)	13.6±1.3	1.2±0.4	0

AVS=acute vertigo syndrome; ICH=intracerebral hemorrhage; NIHSS= National institute of health stroke scale ; GCS= Glasgow Coma Scale

a) Imaging change of central AVS due to acute ICH

The insular lobe (15/70) (Figure 1) was one of the frequent sites of hemorrhage causing central AVS in all cerebral lobes. Of them, the left insular lobe was in 8 (53.3%) cases and the right insular lobe was in 7 (46.7%) cases. Moreover, the hemorrhage involved the posterior insular lobe cortex in 10 patients, median-insular lobe in 2 cases, anterior-insular lobe in 2 cases, and anterior-median insular lobe in 1 case. The smallest hematoma volume was 1.3 ml, and the largest hematoma was 24.5 ml, and the median hematoma volume was 3.0 ml.

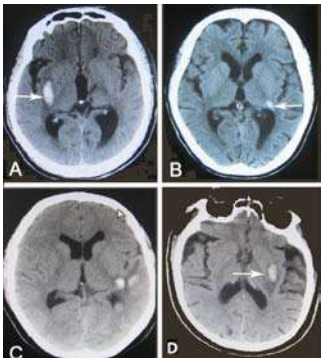


Figure 1: Head CT of acute insular lobe hemorrhage in 15 of 70 patients with central AVS. Here, 4 images were selected that were representative of different topographical regions involved. The median-posterior insular cortex hemorrhage (A, B, C, and D, arrows) shows the features of forming a small elliptical hematoma with AVS.

The other cerebral lobe hemorrhages included frontal lobe in 3 cases, temporal lobe in 2 cases, parietal lobe in 6 cases, and occipital lobe in 4 cases.

Among 15 thalamic hemorrhage cases with central AVS, the patients' head CT showed that 12 (80.0%) cases impaired the thalamic vestibular structure, which was usually limited to the posterolateral thalamus. (Figure 2) Another 3 patients had a vestibular lesion located in the dorsal thalamus, posteromedial thalamus, and global thalamus, respectively. All 15 patients contained unilateral lesions. Of them, intraventricular extension was present in 9 patients, coma or stupor in 5 cases, downward deviation of eyes in 5 cases, hemiparesis in 4 cases, numbness of limbs in 1 case.

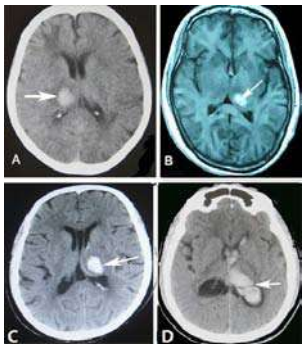


Figure 2: Head imaging (CT or MRI) showing acute thalamic hemorrhage in 15 of 70 patients with central AVS. Here, 4 images that were representative of different topographical region involved were selected. Thalamic hemorrhage with AVS (A, B, C, D, arrows).

The infratentorial ICH leading to an AVS included the brainstem in 10 cases and cerebellum in 12 cases.

b) Study vestibular stations rocking

The images docking test: the images of 3 cases with left posterolateral thalamic hemorrhage with AVS and 3 cases with left insular hemorrhage with AVS were successfully docked in zero distance. (Figure 3. A, B, and C) Whereas, the images of 3 patients with left posterolateral thalamic hemorrhage with AVS and 3 patients with left parietal/temporal lobe hemorrhage with

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AVS were also performed the docking test, but their test were failed due to the distance between thalamus and parietal/temporal lobe vestibular organs. (Figure 3.D,E, and F)

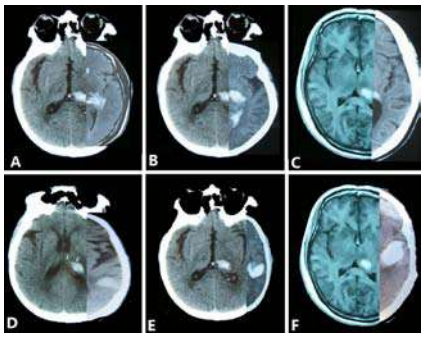


Figure 3: Images docking test. 3 posterolateral thalamic hemorrhage with AVS and 3 posterior insular hemorrhage with AVS (Fig 4. A, B, and C) were successfully docked. Fig 4.D, E and F show that the docking test of 3 posterolateral thalamic hemorrhage with AVS and 3 parietal/ temporal lobe hemorrhage with AVS were failed.

IV. Discussion

Occurrence of central AVS due to infratentorial cerebellar or brainstem hemorrhage is well-known, but central AVS resulting from supratentorial vestibular hemorrhage is not well recognized.

In the present study, 6.2% of patients with acute ICH were associated with central AVS events. We found that the frequent sites of central AVS due to acute ICH were limited between the posterolateral thalamus and insular lobe cortex. Moreover, most patients had a small hematoma, suggesting that this area has a distinct vestibular docking pathway. This speculation is well-supported by evidence from a previous study (10).

Although a previous study demonstrated that the ICH between the putamen and insular cortex accounted for 21% of hemorrhagic lesions in the striatocapsular area (11), the pure insular lobe hemorrhage causing an AVS was rarely reported. Our current data showed that the insular lobe hemorrhage was one of the frequent locations causing a central AVS. Of them, the central AVS with a very small hematoma mainly located in the median- posterior of the long insular lobe. The posterior insular lobe hemorrhage was the most frequent site leading to a central AVS. A previous study confirmed that the primary central vestibular cortex is located in the insular cortex (12), and this has been supported by our current study of head CT.

There have only been sporadic reports of patients with cerebral lobe hemorrhage causing central AVS (13), although the cortical representation of the vestibular projections in human beings has been demonstrated in distinct temporal and parietal areas (14-16]) and the frontal lobe area (16,17) of both hemispheres. The present study showed that insular lobe hemorrhage was the most frequent site resulting in a central AVS, but the frontal, temporal, parietal lobe, and occipital hemorrhage may also present with AVS.

Thalamic hemorrhage occurred in up to 33% of patients with ICH (18). Although a previous PET study confirmed that the posterolateral thalamus is a unique relay station for vestibular input to the cortex (10). Clinically, only 2 patients with thalamic hemorrhage with AVS were reported, including 1 posterior thalamic hemorrhage (19), and 1 posterolateral thalamic hemorrhage (20). However, our current prospective imaging-based study has showed that thalamic hemorrhage is a frequent event resulting in AVS. The location of thalamic hemorrhage causing AVS was typically localized to the posterolateral thalamus. This is the first clinical confirmation via a series of thalamic hemorrhage cases that the posterolateral thalamus is a terminal area of the brainstem vestibular pathway.

Importantly, in our current study series, the images docking test confirmed that 3 cases with left posterolateral thalamic hemorrhage with AVS and 3 cases with left posterior insular hemorrhage with AVS were successfully docked in zero distance. Whereas, because of the long distance from thalamus to parietal/temporal lobe vestibular cortex, the images docking test were failed between 3 patients with left posterolateral thalamic hemorrhage with AVS and 3 patients with left parietal/temporal lobe hemorrhage with AVS. It is show that the precise docking site of vestibular pathway from thalamus to cortex is located between posterolateral thalamus and posterior insular. Therefore, one should keep the fact in mind that the posterolateral thalamus and posterior insular cortex is the frequent/docking sites resulting in central AVS.

However, the limitations of the current study were difficult to avoid. First, patients with small ICH are more likely to mimic a transient ischemic attack or have rapidly resolving symptoms (21), and some patients who suffered from a very small ICH associated transient central AVS were not sent for hospitalization. Therefore, the rate of ICH with AVS may still be underestimated. Second, the confirmed vestibular pathway between the thalamus and insular cortex was based on images docking test, but our imaging studies was still limited. Therefore, further research is necessary. In addition, the rate of nystagmus was low in this series; this is because the majority of patients with insular lobe small hemorrhage were less likely to affect oculomotor function.

V. Conclusions

The frequent/docking site of central AVS is localized between the posterolateral thalamus and

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posterior insular cortex, suggesting that this location has a distinct vestibular docking pathway.

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Conflict of Interest

The authors declare no conflict of interest.

References Références Referencias

1. Neuhauser HK. The epidemiology of dizziness and vertigo. Handb Clin Neurol. 2016; 137:67-82. doi: 10.1016/B978 -0-444- 63437-5.00005-4.
2. Venhovens J, Meulstee J and Verhagen WI. Acute vestibular syndrome: a critical review and diagnostic algorithm concerning the
3. Clinical differentiation of peripheral versus central aetiologies in the emergency department. J Neurol 2016; 263:2151(R)C2157
4. Tamutzer AA, Berkowitz AL, Robinson KA, et al. Does my dizzy patients have a stroke? A systematic review of bedside dianosis in acute vestibular syndrome. CMAJJ 2011;183:E571-E592.
5. Choi JH, Park MG, Choi SY, et al. Acute transient vestibular syndrome: prevalence of stroke and efficacy of bedside evaluation. Stroke. 2017; 48(3): 556-562.
6. Kim JS, Lee JH, Lee MC. Small primary intracerebral hemorrhage. Clinical presentation of 28 cases. Stroke. 1994; 25(7): 1500-6.
7. Hung TP, Lee KY. .Small intracerebral haemorrhage: a study of clinical manifestations and CT findings on 31 cases. Ann Acad Med Singapore.1985; 14(1): 22-31.
8. Kerber KA, Meurer WJ, West BT, et al. Dizziness presentations in U.S. emergency departments, 1995–2004. Acad Emerg Med. 2008; 15:744–50.
9. Kothari RU, Brott T, Broderick JP, et al. The ABCs of measuring intracerebral hemorrhage volumes. Stroke. 1996; 27:1304–1305.
10. Li Q, Yang WS, Shen YQ, et al. Benign Intracerebral Hemorrhage: A Population at Low Risk for Hematoma Growth and Poor Outcome. J Am Heart Assoc. 2019; 8(8):e011892. doi: 10.1161/JAHA. 118.011892.
11. Dieterich M, Bartenstein P, Spiegel S, Bense S, Schwaiger M, Brandt T. Thalamic infarctions cause side-specific suppression of vestibular cortex activations. Brain. 2005; 128: 2052-67.
12. Chung CS, Caplan LR, Yamamoto Y, et al. Striatocapsular haemorrhage. Brain. 2000; 123: 1850-62.
13. Duque-Parra JE. Perspective on the vestibular cortex throughout history. Anat Rec B New Anat. 2004; 280:15-9.
14. Boiten J, Wilmink J, Kingma H. Acute rotatory vertigo caused by a small haemorrhage of the vestibular cortex. J Neurol Neurosurg Psychiatry. 2003; 74:388.
15. Bucy PC. Vertigo with diseases of the central nervous system. Arch Otolaryng 1967; 85:91-92.
16. Toth LI, Assad JA. Dynamic coding of behaviourally relevant stimuli in parietal cortex. Nature 2002; 415: 165-168.
17. Dieterich M, Bense S, Lutz S, Drzezga A, Stephan T, Bartenstein P, et.al. Dominance for vestibular cortical function in the non- dominant hemisphere. Cereb Cortex.2003; 13(9):994-1007.
18. Kluge M, Beyenburg S, Fernandez G, Elger C. Epileptic vertigo: evidence for vestibular representation in humam frontal cortex. Neurology 2000; 55:1906-1910.
19. Inagawa T, Ohbayashi N, Takechi A, et al. Primary intracerebral hemorrhage in Izumo City, Japan: incidence rates and outcome in relation to the site of hemorrhage. Neurosurgery. 2003; 53(6): 1283-97.
20. Nagaratnam N, Hansor M. Acute vertiginous presentation of primary thalamic hemorrhage. Arch Otolaryngol Head Neck Surg. 1990;116:1077-8
21. Tong DM, Zhou YT, Wang G S, at el. Hemorrhagic pure sensory strokes in thalamic and striatocapsular area: causes, clinical features and long-time outcome. Eur Neurol 2010; 64: 275 - 279.
22. Kumar S, Selim M, Marchina S, Caplan LR. Transient neurological symptoms in patients with intracerebral hemorrhage. JAMA Neurol. 2016 Mar; 73:316-20.

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8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



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Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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