Psychopathology

An Empathic Representational Approach

An Integration of Phenomenology and Cognitive Neuroscience

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Foreword

Since its coinage in 1847, the term 'psychopathology' has accrued so many meanings that currently it is little more than a portmanteau. By the end of the previous century, it had about 14 meanings;[1] others have been added since. Polysemic terms have, of course, a role in literature but they may not be particularly useful in medicine.

So, in order for psychopathology to play a role in the complex business of psychiatry, it needs to be restructured and provided with an adequate epistemological basis. Professor Chen's book is an effort in this direction.

Origins of Psychopathology

In his 1845 book, *Lehrbuch der ärztliche Seelenkunde*,[2] Feuchtersleben stated that *Psychopathologie* (p. 69) had not yet gained sufficient knowledge about the mechanisms of madness. In all likelihood, the author wanted for alienism something similar to the new discipline of *Physio-pathologie*, that is, the study of abnormal function in disease. His English translators decided, for some unclear reason, to delete the hyphen.[3] Thus, the term 'psychopathology' (p. 70) was introduced into the English language.

But this only explains the origin of the word. There was not yet content for the putative concept it named given that Feuchtersleben's hope could not be achieved. Psychopathology reappeared in the second half of the nineteenth century, in the work of Emminghaus,[4] Störring,[5] Marie,[6] and others but only to name the collection of descriptions of mental symptoms, that is, an activity known before as semiology (*séméïologie générale*).[7]

1. Ionescu, S. (1991). *Quatorze approaches de la psychopathologie*. Nathan.
2. Feuchtersleben, E. (1845). *Lehrbuch der ärztliche Seelenkunde*. Carl Gerold.
3. Feuchtersleben, E. (1847). *Principles of medical psychology* (H. E. Lloyd & B. G. Babington, Trans.). Sydenham Society.
4. Emminghaus, H. (1878). *Allgemeine Psychopathologie zur Einführung in das Studium der Geistesstörungen*. Vogel.
5. Störring, G. (1900). *Vorlesungen über Psychopathologie*. Wilhem Engelmann.
6. Marie, A. (Ed.). (1912). *Traité International de Psychopathologie Pathologique. Tome Deuxième: Psychopathologie Clinique*. Alcan.
7. Double, F. J. (1811). *Séméïologie générale, ou traité des signes et de leur valeur dans les maladies* (3 Vols.). Croullebois.

Semiology did not disappear altogether for the historian finds it in the great textbooks by Morselli and Chaslin.[8] But the word 'psychopathology' won the day and started to become fashionable at the beginning of the twentieth century. This is the reason why, through Professor Karl Wilmanns,[9] Ferdinand Springer invited the young Karl Jaspers to write *Allgemeine Psychopathologie*.[10]

It can be concluded that in the nineteenth century, psychopathology was far closer to semiology than to physiopathology. Most alienists settled on the view that the new discipline was about the capture and description of mental symptoms. Indeed, during the period aetiological speculation is only to be found in textbooks of psychiatry.

Influences on Psychopathology

All this was to change after two important late-nineteenth-century developments: the growth of clinical psychology and the emergence of psychoanalysis.

As empirical disciplines, psychology and later clinical psychology developed during the second half of the nineteenth century. They soon took charge of the naming and classification of mental functions,[11] and sought to impose these names upon psychopathology. Some of these functions had already been adopted by psychiatrists influenced by Kant and faculty psychology.[12] Other high-level categories, for example, personality, were new and research started to identify how their 'dysfunction' could be clinically expressed.[13] Lastly, first-wave clinical psychologists such as Janet, Ribot, and Piéron started to add explanations to the description of mental symptoms.[14] This trend was continued into the twentieth century, for example, in the work of behaviourists,[15] Eysenck,[16] and more recently cognitive psychologists.

The advent of psychoanalysis was also important. Under its aegis psychopathology became far more than a semiology, and description of mental symptoms gave way to complex interpretations.[17] After the 1910s, this change can increasingly be seen in

8. Morselli, E. (1885). *Manuale di Semejotica delle Malattie Mentali*. 2 vols. Vallardi; Chaslin, Ph. (1912). *Éléments de sémiologie et clinique mentales*. Asselin et Houzeau.
9. Mundt, C. H., Hoffmann, K., & Wilmanns, J. (2011). Karl Wilmanns' theoretische Ansätze und klinische Praxis. *Nervenarzt, 82*, 79–89.
10. Jaspers, K. (1977). *Philosophische Autobiographie* (pp. 22–23). R. Piper; Jaspers, K. (1913). *Allgemeine psychopathologie*. Springer.
11. Danziger, K. (1997). *Naming the mind*. Sage.
12. Hilgard, E. R. (1980). The trilogy of mind cognition, affection and conation. *Journal of the History of the Behavioral Sciences, 16*, 107–117; Brooks, G. P. (1976). The faculty psychology of Thomas Reid. *Journal of the History of the Behavioral Sciences, 12*, 65–77; Albrecht, F. M. (1970). A re-appraisal of faculty psychology. *Journal of the History of Behavioural Science, 6*, 36–40.
13. Berrios, G. E. (1993). European views on personality disorders: A conceptual history. *Comprehensive Psychiatry, 34*, 14–30.
14. Nicolas, S. (2002). *Histoire de la psychologie française. Naissance d'un nouvelle science*. In Press Éditions.
15. Tryon, W. W., Ferster, C. B., & Franks, C. M. (1980). On the role of behaviourism in clinical psychology. *The Pavlovian Journal of Biological Science, 15*, 12–20.
16. Eysenck, H. J. (Ed.). (1958). *Handbook of abnormal psychology: An experimental approach*. Pitman.
17. Masling, J. M., & Bornstein, R. F. (Eds.). (1994). *Psychoanalytic perspectives on psychopathology*. APA Books.

'psychopathology' books.[18] Lastly, the lasting impact of psychoanalysis is one of the explanations for why in the USA the word 'psychopathology' is used as almost tantamount to 'psychiatry'.[19]

Epistemological Worth of Psychopathology

The above historical vicissitudes explain the polysemy of psychopathology but say little about its clinical usefulness, that is, the role that a description of mental symptoms plays in the management of sufferers. This is because usefulness is a function of the epistemological power of psychopathology, that is, of its capacity to obtain 'knowledge'.

'Knowledge' in this context means the finding of stable, negotiated narratives (which are simultaneously cognitive, emotional, aesthetic, and rhetorical) with predictive power and the capacity to generate meaningful and efficient therapies. If this is not achieved, then psychopathology becomes an exercise in futility.

Efforts to assess the epistemological power of psychopathology started during the nineteenth century. *Ab initio*, these concentrated on evaluating the quality of medical examination and conceptually relied on notions such as the clinical eye and introspection.[20]

When during the early twentieth century the epistemology of introspection came under attack from psychology,[21] psychoanalysis,[22] and philosophy,[23] 'interpretations' of mental symptoms started to be preferred to detailed descriptions.

In 1913, Jaspers came to the rescue by claiming 'phenomenology' could provide a solid epistemological justification for psychopathology. By doing so he summoned in favour of clinical descriptivism the power of what, at the time, was a very popular philosophical movement.[24]

Things have changed little since. Within psychiatry there is the tacit agreement that descriptive psychopathology can be supported by some sort of undefined 'phenomenological' conceptualization. By parading Jaspers's 'foundationalism' in the first pages, most European texts of descriptive psychopathology avoid providing their own epistemological justification.

This also seems to be the case with the skeletal definitions of mental symptoms listed at the end of various DSM glossaries, which although parasitical upon the classical

18. Berrios, G. E. (1991). British psychopathology since the early 20th century. In G. E. Berrios & H. Freeman (Eds.), *150 years of British psychiatry* (pp. 232–244). Gaskell.
19. Sutker, P. B., & Adams, H. E. (2002). *Comprehensive handbook of psychopathology* (3rd ed.). Kluwer; Helzer, J. E., & Hudziak, J. J. (Eds.). (2002). *Defining psychopathology in the 21st century*. American Psychopathological Association.
20. Boring, E. G. (1953). A history of introspection. *Psychological Bulletin, 50*, 169–189.
21. Danziger, K. (1980). The history of introspection reconsidered. *Journal of the History of the Behavioral Sciences, 16*, 241–262.
22. Perron, R. (2005). Introspection. In A. Mijolla (Ed.), *International dictionary of psychoanalysis* (p. 871). Gale.
23. Lyons, W. (1986). *The disappearance of introspection*. MIT Press.
24. Berrios, G. E. (1992). Phenomenology, psychopathology and Jaspers: A conceptual history. *History of Psychiatry, 3*, 303–327.

European descriptions want to give the impression that the definitions are written in stone and now lie outside time.

The Statistical Treatment of Psychopathology

Three ongoing fashions seem to be based on the current, unfounded belief that the definitions of mental symptoms have come to stay. One concerns the proliferation of rating instruments and scales. Once used to evaluate severity, the fashion now is to consider them as solid diagnostic tools. To many, rating scales are imbued with the special power of transforming categorical quality into a quantifiable dimension.[25] And to others this type of quantification may even bestow some form of perpetual 'objectivity' upon the data. This is why rating scales are applied mechanically, for example, via the internet. The fact that all the original scale-makers believed that dialogical context was essential to modulate item scores does not seem to worry current users.[26]

The second fashion concerns the view that psychopathology needs 'resharpening'. It is implied that psychopathology was once a 'precision tool' and it, for some reason, has lost its edge.[27] The sharpening in question can be achieved by linking the narratives of psychopathology to the hard neurosciences. Inspired by real science, psychopathology may play a role in the new 'precision psychiatry'.

Others want to interrogate psychopathology the hard way. Large data sets should be subjected to high-power statistical analysis. Such treatment should force the data of psychopathology to divulge patterns and other information that have been hiding for centuries. It is predicted that deep down psychopathology is actually structured in hierarchical dimensions, super-spectra, spectra, sub-factors, syndromes, components, symptoms, and so forth.[28] Once these hidden structures have been found, it is less clear how they should relate to patients in the clinic.

Close to the above is the older proposal of the Research Domain Criteria (RDoC),[29] which assume that subjecting to statistical analysis combinations of all manner of variables (psychopathological, social, neuroscientific, etc.), patterns, and structures could emerge, which could be recognized as new mental disorders.

In general, this approach seems to assume that the information obtained in the mental state examination, just like platonic ideas, has eternal ontology and that once

25. Berrios, G. E., & Marková, I. S. (2013). Is the concept of 'dimension' applicable to psychiatric objects? *World Psychiatry, 12*, 76–78.
26. Berrios, G. E., & Bulbena-Villarasa, A. (1990). The Hamilton Depression Scale and the numerical description of the symptoms of depression. In P. Bech & A. Coppen (Eds.), *The Hamilton Scales* (pp. 80–92). Springer.
27. Schultze-Lutter, F., Schmidt, S. J., & Theodoridou, A. (2018). Psychopathology: A precision tool in need of resharpening. *Frontiers in Psychiatry, 9*, 1–6.
28. Lahey, B. B., Moore, T. M., Kaczkurkin, A. N., & Zald, D. H. (2021). Hierarchical models of psychopathology: Empirical support, implications, and remaining issues. *World Psychiatry, 20*, 57–63.
29. Cuthbert, B. N., & Kozak, M. J. (2013). Constructing constructs for psychopathology: The NIMH research domain criteria. *Journal of Abnormal Psychology, 122*, 928–937.

saved in a hard disk it will keep forever. This approach also disregards contextual information which is known to provide symptom recognition with meaning.[30]

The interesting issue here is that some of the questions above have an empirical answer. Before embarking in grandiose numerical exercises, workers should ask what the epistemological shelf life of their data is, even within the same patient. For example, are the 'hallucinations' found in the first episode the same clinical phenomenon (in both psychological and neuroscientific terms) as the 'hallucinations' found twenty years later?

Whither Psychopathology?

Books like Professor Chen's rekindle a much-needed dialogue about psychopathology, its meaning, and its future. In this regard, I want to consider just three options.

One is for psychopathology to return to its original calling and become a sort of 'physiopathology' of mental symptoms, that is, a set of empirical accounts of how mental symptoms are actually constructed.

To achieve this aim, psychopathologists will have to abandon their enthralment to 'brainhood',[31] that is, the view that madness must only be about the brain. When at the beginning of the nineteenth century alienism began to be constructed, the stomach was very much in running as a site for madness.[32] For almost two centuries 'brainhood' has reigned supreme. It would seem that of late the good old digestive system is being reconsidered.[33]

The second option for psychopathology is to remain at a descriptive level and try to reinforce its epistemological value by re-examining introspection,[34] by reaffirming its dialogical and contextual basis and developing some pride in its narrative quality.[35] It will have to show that (1) the type of knowledge obtained in the clinical dialogue is qualitative, broader, and deeper than mere cognitive information; (2) statistical treatment of the information obtained attenuates or deletes important nuances hidden in the descriptions; and (3) there are no hidden patterns in large conglomerations of data for they do not originate from a closed platonic universe; on the contrary, they exhibit the same volatility as the rest of the cultural objects.

The third option for psychopathology is just to curl up in the corner of a historical library and die. In this Brave New World, all psychiatric diagnosis will be done by

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markers, and precision psychiatry will find the exact cure. Psychopathology may even be made to survive as a sort of conversational piece, a nicety that courteous psychiatrists (or computers) will want to exchange with sufferers (or carriers or disease) whilst the real stuff is going on.

Professor Chen and His Book

It is a pleasure to see that Professor Chen, once upon a time an active member of the Cambridge Psychopathology Group,[36] remains active in this field and has now decided to throw his hat into the ring. His book deserves the most attentive of readings. I wish it every success. Indeed, the future of psychopathology may partly depend upon the kind of stir it should produce.

Professor German E. Berrios
University of Cambridge, 2021

36. Marková, I. S., & Chen, E. Y. H. (Eds.). (2020). *Rethinking Psychopathology: Creative Convergences*. Springer.

Preface

This book is an in-depth exploration of psychopathology as subjective experiences that reflect underlying dysfunctions in the brain. Psychopathology is important because there are natural patterns in the disruptive experiences that may help us in arriving at a better understanding of the underlying conditions and hence better treatments.

Generations of clinicians and researchers have pondered upon how to distil the information contained in these subjective experiences. Access to subjective experience is a complex business and requires substantial skills, which is sometimes neglected in today's clinical practice. In our fast-paced world, it can be tempting to reduce psychopathological evaluations to simple processes such as checklists. Related to this is the reductionist optimism that measures such as brain scans may provide the required information instead. This hope turns out to be over-simplistic. An integrated approach is needed.

The richness of the emerging psychopathological information demands a reflection on the adequacy of our underlying model for human experiences. A more fit-for-purpose psychopathology framework may be critical in meeting the needs of modern psychiatry, for example, in early symptom and risk-states detection.

Descriptions of human subjective experiences involve skills and knowledge shared by a broad range of disciplines, including not only psychiatry, medicine, and psychology but also cognitive science, linguistics, ethnography, phenomenology, computational science and neuroscience. Psychopathology stands to benefit from harvesting the cross-fertilization of these fields, bringing together new insights, paving the way for enriching our understanding.

This exploration cannot be separated from the ongoing clinical, research, and teaching activities, which span more than a decade, during the active preparation of this work. Lively discussions with colleagues in different settings provide the background for this work.

This work serves as a platform to bring these dialogues to a wider range of clinicians, researchers, and students of psychopathology. It should also be of interest to those exploring related aspects of human experiences. In using this work, it is advisable to allow oneself sufficient time for an active interaction with the various ideas, to

ponder and reflect upon them. Many of the topics can be fruitfully explored in group discussions.

It is becoming increasingly clear that contemporary psychopathology may have to deal with a 'moving target', with the realization that distress of the human mind can no longer be seen as a static object. The modern age has brought accelerating changes in the way people experience life. Studying this complex subject requires incorporating a capacity for embracing future changes. To this end, it is particularly important to build a foundation with sufficient breadth and depth to allow for timely responses to the ever-changing human experiences today.

Introduction

An Empathic Representational Approach to Psychopathology: Integration of Phenomenology and Cognitive Neuroscience

Psychopathology is concerned with the study of experiences that are manifestations of disruptions to the healthy functioning of the mind (Berrios, 1996; Jaspers, 1913/1963; Marková & Berrios, 1995, 2009). Mental symptoms are expressed in the subjective experiences of mankind. This domain of knowledge traverses the Natural Sciences and the Human Sciences and presents unique conceptualization challenges. A framework that facilitates integration between cognitive science, brain science, and phenomenology is essential for progress.

Systematic investigations of anomalous subjective experiences facilitate the understanding of mental conditions. Psychopathological information is essential to guide treatment, to estimate prognosis, and to facilitate early detection of disorders. Psychopathology has achieved some successes, but it has also met with significant challenges. It is likely that subjective experiences contain information about anomalous brain states. This information is conventionally accessed through the use of rating scales, with their inherent limitations. If psychopathological phenomena could be better observed and integrated with relevant knowledge domains, they may contribute to better prediction models to advance intervention efforts.

The methodology of psychopathology needs to be reviewed alongside progress in the studies of subjective phenomena as well as in brain and cognitive sciences. This work contributes towards this effort: to encourage a more refined treatment of psychopathology that rejects a simple mechanistic approach. It seeks adequate handling of human subjective experiences, respecting their uniqueness and complexity (Berrios, 1994), while at the same time reaching out to bridge insights from brain and cognitive studies.

Several existing accounts provide a conventional description of mental symptoms (e.g., Fish & Hamilton, 1985; Oyebode, 2015). This work explores new perspectives rather than compiling a list of mental symptoms. It examines some underlying frameworks in psychopathology, in order to identify new bridges between psychopathology and other emerging fields of knowledge. The current approach focuses on mental representations as keys for understanding the relationship between the mind and the information it handles. This perspective provides novel insight about the problems that can arise when there are failures in the operations of mental representations. We

consider how these may be linked with symptoms as described in classical descriptive psychopathology, such as those summarized in Karl Jaspers's *General psychopathology* (1913/1963), which articulated a methodology for systematic investigations of anomalous experiences. The phenomenological approach was adopted for this purpose (e.g., Jaspers, 1912/1968, although for a critical discussion see Berrios, 1992). We aim to connect descriptive psychopathology with relevant emerging approaches that have become available since then. These include the fields of language and communication, cognitive processes, evolutionary biology, information science, and cultural processes. We build upon earlier explorations of the bridges between subjective experience and brain biology (e.g., Andrieu, 2006; Varela & Shear, 1999). These works initiated an emphasis on the active roles of the subjective mind amidst a predominantly reductionist neuroscience. They also suggested integrating phenomenological data (as first-person accounts of lived experiences) with measurements of brain activities (e.g., gamma oscillations) to varying degrees of success. The current account encompasses a broader conceptual approach that locates the actions of the mind in an 'information' domain. It is proposed that a key level of analysis in psychopathology could be at the level of mental representations. The objective is not to dwell on the details of neuroscience studies but to generate innovative ideas relevant to psychopathology. In the perusal of this goal, we shall try to be as specific as possible in describing mental representations through algorithms. We shall see that this approach does not lead to a 'reductionist explaining away' of phenomena, but instead it facilitates a better grasp of the complexity of various phenomena in the context of a holistic perspective of the human person. Along these explorations, we shall ponder upon new conceptual perspectives that are encountered. From these, we select useful ideas for applications in psychopathology. New ideas are considered to be useful when they address observations not previously accounted for, when they provide more parsimonious accounts than existing theories, when they provide integration between divergent perspectives, when they provide predictions not originally presupposed, and when they can be organized into a coherent framework. This work presents some of these ideas to clinicians and researchers.

We start the discussion with a review of the status of psychopathology as an empirical discipline (Chapter 1). This review highlights the need to address the unique nature of subjective human experience as a non-material, non-repeatable, but partially communicable domain. Psychopathology needs to address its non-material yet biologically based roots. The connection with brain function needs to be articulated at a useful level of analysis and not to be over-simplified in a coarse reductionist fashion. In Chapter 2, we explore information-handling functions of the brain from a biological, evolutionary, perspective. A reflection of the nature of 'information' in the brain is vital for psychopathology. Cognitive structures that hold information (i.e., mental representations) are considered as keys for connecting biology with psychopathology. Mental representations are proposed as basic building blocks for phenomenal experiences. We refer to mental representations as a variety of cognitive structures in an individual that *stand for* (*represent*) 'objects' or 'states of affairs' in the environment. They are presumed

to be implemented by brain processes involving structures that allow data computation. Mental representations can be communicated between individuals. Low-level representations are involved in perceptual processes. High-level representations are dynamic, adaptive, and potentially autonomous. The notion of 'representations' has inherited multiple meanings. In this work, the term 'representation' is primarily used to refer to individualist, cognitive, 'mental representations' rather than in the sense of interactionist, communal, 'social representations'. The term 'mental representation' is used to refer both to the *structure* that can be filled with informational content at different times and to a particular *filled structure* representing a particular external object at a particular point in time.

The roles of 'mental representations' as information receptacles are introduced so that the reader can consider their relevance alongside the exploration of human experience from a phenomenological perspective. Phenomenology refers to an approach that emphasizes the importance of returning to the direct, raw subjective experience as a starting point in human knowing. In Chapter 3, we explore a phenomenological account of the core structure of human subjective experiences (i.e., what we can know about the subjective human experience as someone who directly accesses this experience from a first-person perspective).

This exercise identifies the essential, minimal, components of momentary experience, highlighting the features of temporality, relational nature, and agency. In Chapter 4, these essential components are extended to different experiential domains in the longitudinally unfolding human person. One crucial domain is the relationship with other people. In Chapter 5, the phenomena of relating to other people through empathic processes are explored. This leads to a discussion of the pivotal role of empathy in human experience. Out of the many different possible approaches to empathy, our exploration is influenced by the early phenomenological work articulated by Stein (1916/1970), consistent with our preference for a minimalist starting point in phenomenology. This approach is also coherent with a framework for conceptualizing the person in a holistic manner.

It is through empathy that the mind acquires the capacity for reflection upon itself, as well as the ability to explore the natural environment empirically. We shall see that it is also through empathy that it is possible to clarify psychopathological phenomena, through the alignment of representations between participants of a clinical dialogue (see Chapter 9). In Chapter 6, we return to a more advanced account of mental representations, now ready to be applied to various levels of subjective phenomena. Importantly, this account also facilitates an appreciation of the potential effects of rapid changes in the digital technological environment upon human experiences. We discuss how mental representations can be made as explicit as possible with the help of simple computational models. These models prepare for a consideration of how breakdowns in mental representation may underlie anomalous experiences (Chapter 7). Chapter 8 provides a discussion on how mental representation dysfunctions can account for a variety of anomalous experiences, suggesting novel conceptualizations of anomalous

experiences according to the different modes of breakdown. In Chapter 9, we conclude with a pragmatic consideration of how empathy is used for the clarification of psychopathological processes, using the mental representation approach articulated in the earlier parts of this work. We look into the clinical dialogue as a method to access psychopathological signals. We consider how empathic processes are involved in communicating anomalous experiences. With these new insights, we end the exploration with an integrated approach to psychopathological assessments.

The term 'psychopathology' is used notwithstanding its stem '-pathology' being often used in medicine to suggest cellular disease mechanisms. However, 'psychopathology' has traditionally been used to refer to descriptive studies of mental symptoms. Acknowledging these caveats, we shall continue to use the term 'psychopathology' for the sake of continuity.

4

Unfolding Phenomenological Processes in the Human Person

4.1 Engaging with Life Experiences

After considering the basic unit of experience (see section 3.4.1), the act of experiencing (see section 3.5), and the objects of the experience (see section 3.4.3), we now turn to a broader perspective to consider the Person as the living agent that is acting and experiencing in his Lifeworld throughout time.

In the psychopathological assessment, the Person is often considered as a passive recipient of 'life events' and other stressful 'factors', with scanty considerations of his active role in his Lifeworld. This bias had arisen from a narrow perspective of the Person.

We propose a more comprehensive account of the individual's active interaction with his world. This view emphasizes (1) a development path leading to the individual in his present circumstance and (2) the individual can make active choices regarding his development path. Psychopathological conditions impact how the individual makes active choices in his Lifeworld. The engagement of a subject with his Lifeworld involves the specific engagements with his own physical body as well as with objects in his proximal environment. When a person relates to his world in a creative fashion, objects that he relates to are animated and 'imbibed with life'. Understanding the roles played by the active person is important for clinical assessment and management.

The life development of a person can be considered as a process of 'actualization' that involves the unfolding of potentials with time (Stein, 1931/1998). It is useful to consider each life experience as engaging the person in some specific domains. Stein (1931/1998) described an 'interface with life' in which the person contacts each external object and life circumstances at some prescribed 'levels'. Engagement with life experience leads to accommodation and assimilation in the mental model, resulting in a gain in information. Before the encounter, the potential for knowledge is referred to as *Intellectus possibilis* (possible insight) (see Figure 4.1). This is a potential that can only be fulfilled with future encounters. After a successful encounter, new knowledge emerges. *Intellectus possibilis* is transformed into 'habituality' as the individual masters the new knowledge. In this process, information is created in the person's mind as fulfilled representations. As a result of biological potentials, active choices, and life opportunities, the person develops unique 'habit structures' with fulfilled representations.

Habit structures then enable behaviours that further influence the cascades of engagements in subsequent life encounters.

Some people choose to engage very deeply with some aspects of life. Others choose to engage more superficially. It is possible to live one's life with only superficial engagements. If there is only minimal engagement, the deeper layers of potentiality in a person remain latent and not actualized. This is a situation that has been described as *inauthentic living* (Macquarrie, 1972).

Some limits to the potential in a person have already been laid down from the beginning of their life. The unfolding of that given potential eventually depends on personal choice and circumstances (see Figure 4.1). The engagement process changes what is in the external world as well as what is in the inner world. When potentials are not actualized, opportunities in both worlds (internal and external) remain unfulfilled. What is not actualized is lost forever. The loss is not only in external opportunities but also in the unfolding of that person's potential, in that their actualization is less than what could have been. The actualization of individual potentials as fully as possible through proper engagement is an important aspiration in human life.

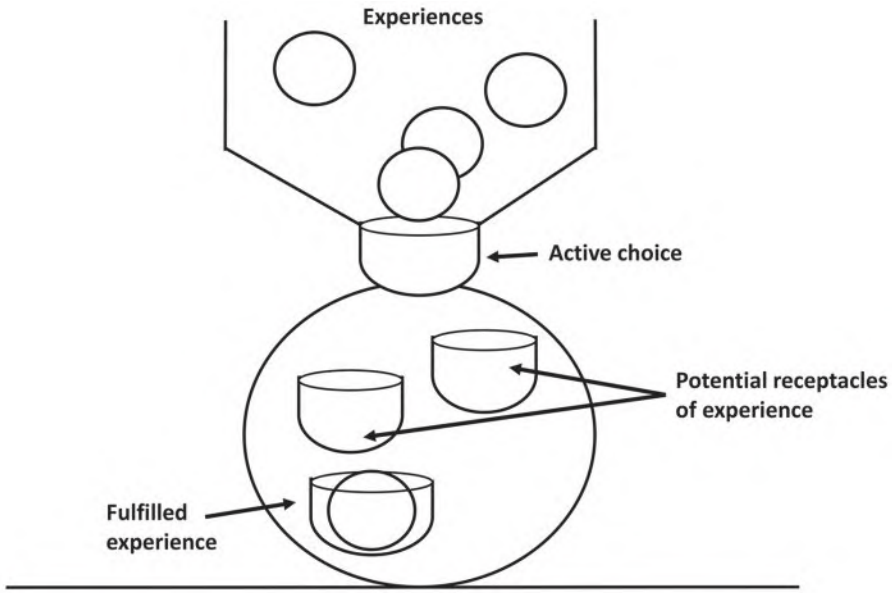

Figure 4.1. Engagement of a person with potential experiences. A person has some degree of choice over engaging with different experiences in life. Potential experiences (opportunities) are represented as circles. The person has some degree of choice in selecting the experiences for further processing. The person's capacity to receive experiences is represented by empty receptacles. There is individual variation in capacity to receive experiences. Once the experience is engaged, information is obtained, it becomes a fulfilled experience. This is represented by the circle being engaged in one of the potential receptacles, I (see section 4.1).

Once at a Chinese tea shop, the owner was having a conversation with an elderly Buddhist nun. After a good infusion of fine tea, the owner laid out the tea leaves and said, 'After producing a good cup of tea, these tea leaves have fulfilled their missions in life.' The nun said, 'It is indeed important to live as these tea leaves; many people today are not engaging their full potentials. Many are paralysed by a false sense of modesty; others are plagued by a lack of self-confidence. One should aim to fulfil one's potentials and make good use of one's gifts in life, no more, no less. It is not a matter of responsibility; it is a matter of natural development.' For patients with psychiatric conditions, stigma would make this struggle significantly harder. A key role of the clinician is to support patients in the development of their full potentials, minimizing the impacts of the illness.

4.1.1 Potentials for the reception of experience

Humans show individual variations in their abilities to fruitfully engage with specific aspects of experience. Conceptual capacities are required to master specific areas. For example, the ability to engage with advanced mathematics is not endowed with every person.

In learning, there is a transition from potency to action, from the 'possible' to the 'realized'. In this process, information is generated. After learning, the mind is more 'specified' than before (see section 3.5 on information).

Some areas of experience are pivotal, in that engagement with them will lead to the mastery of a 'seed' structure (mega-representation) that can be of use in a number of other areas. In this way, new areas can be more easily mastered after the 'seed' structure is attained through hard work in the initial area. One example is traditional Chinese calligraphy. Through calligraphy, one acquires a sense for the oriental aesthetics of movement and stillness, space and foreground, subtlety and force. These aesthetic principles generalize to other oriental artistic domains, such as music and poetry. It is not surprising that oriental arts are often considered as a set (e.g., music, Go, calligraphy, and painting). Similar functions have been suggested in the learning of Latin in European education. The language provides a 'seed' structure for organizing experiences. Clinicians should have a broad knowledge of the various life domains even though they themselves may not be able to engage with all of them. In this way, they can appreciate the pattern of Lifeworld engagements and developments in their patients.

4.1.2 Experiences and meaning

Individual background shapes the reception of life experiences (see Figure 4.1). Incoming information interacts with existing information in the mind. In this interaction, existing knowledge templates accommodate the incoming information. Existing templates are already organized within an individual mind to produce an optimal degree of coherence. The degrees of fit between the incoming information and the

7
Representation Failure and Psychopathology

The current account makes explicit the role of representations in mediating experiences. It enables the potential considerations of psychopathological phenomena as failures of representation. We explicate the basic operations in representations using the simplest parallel distributed model (see section 6.5.4). We explore potential mechanisms in which representational processes can fail and illustrate how these may be relevant for understanding human psychopathological experiences. We also explain how information computation failure in the human brain can give rise to the qualitative characteristics of a wide range of psychopathological phenomena. It is important to note that this chapter tries to explicate anomalous phenomena as much as possible by referring to the potential processes involved in mental representation. We do not make claims that the account is exhaustive. However, it is important to appreciate the limits of explanation given what we already know. Making these explicit leads to new perspectives and new ways of thinking about psychopathological mechanisms. This account does not claim to be the final say. It recognizes itself as part of a process of increasing the understanding of psychopathological processes.

It is worth noting the traditional distinction between positive and negative aspects of psychopathology. Negative processes are the impaired functioning of normal mechanisms, representing a loss of normal processes. Positive processes are an anomalous presence of pathology. They are generally more difficult to account for. Traditional accounts often propose failure of inhibition of latent processes (Crow, 1980, 1982; Jackson, 1932). A representational perspective offers explanatory possibilities to understand a range of positive psychopathology.

7.1 Constraint Satisfaction Failures

7.1.1 Context failure (clamping)

In the constraint satisfaction (CS) model, a problem is solved by evoking the external conditions as 'givens' (clamped constraints) and then allowing the free parameters in the representational network to settle into a solution based on internal regularities. CS failure results from a failure to regulate the 'clamping-freeing' process, that is, clamping

of some feature units for just long enough to allow the rest to freely evolve. If clamping is too rigid, the processing may be restricted by the inflexible context. If the clamping is too feeble, the context may drift too readily for a stable solution to emerge. Clamping failure can offer a computational perspective in understanding pathological phenomena such as thought disorganization (tangential thinking) and perseveration (insufficient clamping) (see Figure 7.1). Dysregulated clamping results in maladjustments in shifting, either in drifting contexts or fixed rigid contexts.

7.1.2 Signal synchronization failure

Neural synchronization is an important mechanism for maintaining the coherence of information relating to individual objects across multiple processing streams (Singer, 2000). In the brain, information that originates from a single object is eventually handled by a number of parallel streams. It is important to have some means of tracking which information belongs to a given object, particularly if a number of objects are being processed at the same time. It appears that the neural signals relating to a single object are oscillating in-phase, even when segregated into different processing streams in different parts of the brain (see Figure 7.2). These oscillations are of relatively high frequency (detected in the gamma-band in electroencephalography). Failure of gamma-band synchronization in psychosis has been postulated to result in anomalous coherence as well as inadequate coherence in representations, giving rise to positive and negative symptoms, respectively (Phillips & Silverstein, 2003; Silverstein & Keane, 2011; Uhlhaas & Singer, 2010). In terms of mental representations, the different dimensions in a representation (location, size, texture, movement, etc.) are processed by different brain systems. The information is linked to a single object in the environment by

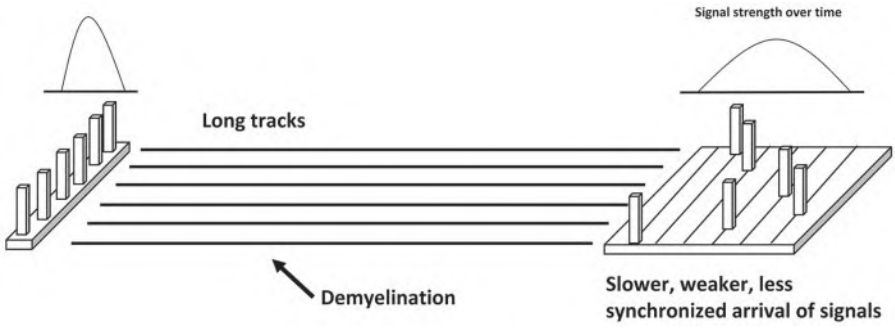

Figure 7.2. Long-tract conduction failure. Parallel signals along longer neural tracts may become desynchronized. This may involve a lowering of signal conduction efficiency (e.g., in inefficient myelination), resulting in increase in variability in conduction speed on top of slowing. In parallel distributed processing, less synchronization in the arrival of signals to the next set of processing units will affect the strength and clarity of the set of arriving signals (see section 7.1.2).

gamma-band synchronization processes. Failure in these processes results in a representation with weakened structure; that is, the dimensions hang together only loosely.

The failure of synchronization can also arise from a number of other mechanisms. Synaptic events and modulation by excitatory and inhibitory cortical pathways are possible candidates. In addition, neural conduction along long tracts in the brain may take a finite amount of time. Parallel signals along long tracts may become temporally diffused (desynchronized) if the axonal conduction processes are compromised (e.g., by demyelination). Such impediments result not only in a slowing of signal conduction but, importantly, in an increase in variability in the conduction velocity between individual fibres, resulting in reduced synchronization in the arrival of signals to the next set of processing units (Miller, 2008). Lengthening of reaction times with increased variabilities in various brain domains is an observation frequently made in schizophrenia, affecting phenomena such as motor reaction time and event-related potentials. Synchronization failure weakens the definition and sharpness of signals and compromises computations such as CS in a general manner (see section 7.1.2.1).

7.1.2.1 *Generic constraint satisfaction failure*

General CS failure can occur even where simple generic mechanistic processes are involved. An example is the effects on simple reaction time tasks when a lengthening of response time and a decrease in accuracy of response are observed. This generic CS failure can contribute to reduced information handling efficiency in a broad range of cognitive areas.

7.1.2.2 *Constraint satisfaction threshold shifts*

Computations in propositional thinking necessitate a flexible range of CS threshold to be adjusted based on particular contexts. The CS threshold determines the level of coherence required before CS processing is considered resolved. For instance, in poetry, a more diffused mode of operation calls for a lower CS threshold than for rational thinking, such as in computer programming.

The CS threshold may also be programmed to change with time. Problem solving can start with a less stringent criterion (lower requirement for CS fit) for an initial direction. This is followed by a gradual tightening of the criteria (higher requirement for fit). This process is called 'simulated annealing'. It may lead to efficient solutions in a limited amount of time (Rumelhart et al., 1987).

In situations of dopamine excess, salience would lead to a pressing search for expected CS resolutions. As a result, a loosening in CS threshold may be involved. To accommodate a broader range of observations, the system also searches more widely for patterns with more parameters involved and to arrive more readily at possible solutions. This situation may be relevant to the experiences of ideas of reference and spurious salience in psychotic states.

Conclusions

This work articulates a framework for contemporary psychopathology through an integration of biology, cognitive science, and phenomenology. It starts by examining the nature of psychopathological data as raw subjective experiences and ends with a pragmatic review of how to access quality phenomenological data in clinical settings. In this exploration, we are led to review our model of subjective experiences in the human person. This review highlights the need for a more comprehensive approach accommodating experiential as well as mechanistic perspectives. This approach addresses the shortcomings of a narrow mechanistic approach to mental illnesses.

This book asserts that subjective experiences (phenomena) of a person is of central importance to understanding mental illnesses. It also identifies the use of two key cognitive variables, information and representation, as crucial conceptual bridges between biology and phenomenology. Phenomenology and biology are complementary perspectives that can be integrated to construct a coherent account of human experiences and how it is affected by brain illnesses, as well as how the individual reacts to these experiences.

It is important to recognize that these perspectives should be integrated rather than polarized. Empathy is a key link between these elements. Empathy is also the basis upon which psychopathological evaluation becomes possible. The clinician needs to mobilize his own empathic processes to access psychopathology in another person. While this process allows some aspects of subjective experiences to be made shareable, it is important to be aware of its various limitations. Some of the limitations can be approached with a reflective process of clinical dialogue. Conceptual accounts of empathy can be integrated with empirical studies to yield a rich framework for understanding the processes involved in the practice of psychopathology.

This account lays the groundwork for innovative initiatives in the study of mental symptoms. It argues that some components of mental symptoms are shareable between individuals, consistent between individuals, and can be mapped to functions of the brain. The scientific foundation of such study gives the promise that the data will contain information at the level of brain-computational dysfunctions. Attention to these processes will enable the study of mental symptoms to discriminate better

between different sources of anomalous processes that contribute to the evolution of symptoms. This will allow empirical data to be acquired in a more discerning manner. Such initiatives will require continuing efforts but will be rewarded with a more considered approach to the understanding of mental illnesses and a promise to contribute to better healing endeavours.

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