

Abstracts

**Annual Meeting of the
International Association for Perceptual Control Theory
(Formerly the Control Systems Group)
11-13th September, University of Manchester, UK, 2019**

International training of MOL within a trial of psilocybin for residual depression

Sara Tai, University of Manchester, UK

TBC

Form Emerging from Chaos: Implications of Reorganisation for Psychotherapy Outcome Trajectories

Vyv Huddy, University of Sheffield, UK

When session-by-session symptom scores are plotted for those attending psychotherapy change trajectories appear highly discontinuous and, apparently chaotic. However, patterns can be discerned - a large proportion of gains occur suddenly and early in therapy. The majority of research on these clinical phenomena has, so far, been descriptive, with limited theoretical explanation of the underlying processes. An exception to this is the description of how the reorganisation component of Perceptual Control Theory (PCT) relates to psychotherapy change trajectories. Key to this account is the "trial and error" change process, which was implemented in a generative model. This model simulated change trajectories of a large group of individuals attending a UK psychotherapy clinic. The model assumed that 1) the symptom score at each session expresses the client's current state of "error"; 2) each session is an opportunity to reorganize goals and generate novel solutions, which are then evident in reduced subsequent error. The simulation generated by the model revealed a pattern of early gains that resembled the clinic data. A similar topography of sudden gains was also observed in the simulation. These findings demonstrate reorganisation provides a plausible explanation of how psychotherapy change trajectories are generated. Furthermore, it provides further validation of the PCT explanation of how psychotherapy alleviates distress.

A brief transdiagnostic group (the Take Control Course) compared to individual low-intensity CBT for depression and anxiety: a randomised non-inferiority trial

Lydia Morris, University of Salford & Six Degrees Social Enterprise; Karina Lovell, Warren Mansell, Lesley-Anne Carter, Dawn Edge, University of Manchester, UK; Richard Emsley, Institute of Psychiatry, London; Phil McEvoy, Tanya Wallwork, Rachel Bates, Six Degrees Social Enterprise

Interventions targeting processes that commonly maintain different psychological disorders appear promising. Very few studies have examined brief transdiagnostic groups. One such intervention, the Take Control Course (TCC), based on PCT, has been developed for patients with common mental health problems in low-intensity IAPT services. We aimed to evaluate whether TCC is non-inferior to individual low-intensity cognitive behaviour therapy (CBT). We used a single-blind individually randomized parallel non-inferiority trial comparing TCC to individual low-intensity CBT. Primary outcomes (depression and anxiety scores) were measured at 6-month and 12-month follow-up. A total of 156 patients were randomised. Intention-to-treat and per-protocol analyses of 6-month data indicated that TCC was non-inferior to individual low-intensity CBT on anxiety and depression outcomes, functioning.

Intention-to-treat and per-protocol analyses at 12-months found inconclusive evidence of non-inferiority. This is the first randomised trial providing evidence for the non-inferiority of a brief transdiagnostic group compared to established individual therapy. Full paper submitted to Behaviour Research and Therapy.

An adaptation of the Take Control Course to recovery from combat-related ill-health in military veterans

Susan McCormack, Mode Rehabilitation & University of Chester, UK

A key component of recovery from combat related ill-health is the provision of a sense of purpose and community derived from a new suitable career. A mini presentation of quantitative and qualitative data of the conflict experienced by ex-service personnel before and after attendance on the Project RECCE skills-based intervention using Perceptual Control Theory (PCT) and an adaptation of the 'Take Control' course to inform practice. We report on our findings from 10 participants who presented with multiple problems including Post Traumatic Stress Disorder (PTSD). Attendance on the Project RECCE course by serving personnel and Method of Levels rehabilitation support reduces incidences of mental ill-health during and post discharge.

A Test of the Feasibility of a Visualisation Method to Show the Depth and Duration of Awareness During Method of Levels Therapy

Jakub Grzegorzka & Warren Mansell, University of Manchester, UK

Many psychological therapies help clients to direct and sustain their awareness onto specific aspects of their problems to promote change. Yet, no theory-driven measure exists that can code moment-by-moment changes in awareness during a therapy session. It is known that awareness plays a crucial role in the process of change, but little is known about the underlying core processes. Perceptual Control Theory (PCT) offers a scientific explanation of psychological distress as loss of control and describes the role of awareness in processes responsible for restoring control by resolving any internal conflict. The Depth and Duration of Awareness Coding Scheme (D-DACS) was previously developed to capture the person's current focus of awareness and its duration on the areas that from a PCT point of view are desirable in order to facilitate effective psychological change. The current research applies D-DACS to code three publicly available Method of Levels (MOL) therapy sessions delivered by an expert therapist and presents a visual representation of the client's presumed attention in these sessions. The results showed that an average of 61.65% of the client's attention was focused on the D-DACS areas, which is higher than the previous studies involving novice therapists. The produced visual representation of the clients' presumed attention helps to examine the utility of this new coding scheme and further examine the validity of the underlying theory. Such work might help in examining effectiveness of therapy in meeting the underlying theoretical foundations of change. However, limitations and areas for improvement are also evident. Full paper: <https://doi.org/10.1017/S1754470X19000199>

Using Perceptual Control Theory to understand the transition from contemplating suicide to making a suicide attempt

Vanessa G. Macintyre, Warren Mansell, Sara Tai, & Daniel Pratt, University of Manchester

Perceptual Control Theory has informed our understanding of a number of mental health problems, but has not yet been applied to understanding how individuals transition from thinking about suicide to making a suicide attempt. This is an important research area since

only 29% of people who contemplate suicide make an attempt, and the current suicide literature does not explain the psychological processes underlying this transition. A greater understanding of these psychological processes will enable psychological interventions to be developed which directly target these processes, which in turn could prevent further deaths by suicide. This talk will describe a new model of suicide which has been guided by the principles of PCT. It explains the transition from contemplating suicide to attempting suicide as being due to limited awareness of one's personal goals and how they would be negatively affected by suicide. In addition, the talk will explain how Method of Levels therapy can be used to address the problem of limited awareness in suicidal individuals. Lastly, future plans for testing the hypotheses of the suicide model will be described.

Empowered Conversations: A PCT-based communication training for carers of people living with dementia

Lydia Morris, University of Salford & Six Degrees Social Enterprise; Warren Mansell, University of Manchester; Anthea Innes, University of Salford; Alison Wray, Cardiff University; Phil McEvoy, Six Degrees Social Enterprise

This presentation aims to demonstrate the power of integrating three theoretical perspectives (Mentalization Theory, Perceptual Control Theory and the Communicative Impact model), which jointly illuminate the communication challenges and opportunities faced by family carers of people with dementia. To point the way to how this framework informs the design and delivery of carer communication and interaction training. Our conceptual synthesis is based on a narrative review of relevant literature, supported by examples of family carers. We use the conceptual models to show how the capacity to mentalize (“holding mind in mind”) offers a greater sense of control over internal and external conflicts, with the result that they can be deescalated in pursuit of mutual goals. The integrative conceptual framework presented here highlights specific psychological and relational mechanisms that can be targeted through carer training to enhance communication with a person living with dementia. Full paper at: <https://doi.org/10.1177/1471301218805329>

Agents of change: A Multi-Method Study to Optimise the Helpfulness of an Artificial Relational Agent for Treating Mental Health Problems

Hannah Gaffney, University of Manchester, UK

Objective: To understand theory driven, therapeutic processes associated with the helpfulness of an online relational agent intervention, ‘Manage Your Life Online’ (MYLO).

Methods: Fifteen participants experiencing a mental health related problem used MYLO for two weeks. At follow-up, participants each identified two helpful and two unhelpful questions posed by MYLO within a single intervention session. Questions were rated for helpfulness and various therapeutic process factors including therapeutic alliance. A mixed effects model was fitted to examine associations between helpfulness and therapy process factors. Qualitative interviews analyzed using thematic and content analysis enabled further insights into the process of intervention with MYLO, its acceptability and design.

Results: MYLO appeared acceptable to participants with a range of presenting problems. Questions enabling free expression, increased awareness, and new insights were key to helpful intervention. Findings were consistent with core processes of therapeutic change, according to Perceptual Control Theory (PCT), a unifying theory of psychological distress. Questions that elicited intense emotions, were repetitive, confusing or inappropriate, were identified as unhelpful and were associated with disengagement or loss of faith in MYLO.

Conclusions: Findings provide insight into likely core therapy processes experienced as helpful or hindering and outlines further ways to optimize acceptability of MYLO.

Full paper submitted to Sage Digital Health.

Undoing arbitrary control practices in cancer services. Developing a Method of Levels approach to psychological skills training for cancer nurses

Mike Rennoldson

Improving the psychological care of people with cancer is an urgent concern. Around 40% of cancer patients experience clinically significant distress, and distress is an independent risk factor for mortality in cancer patients on a par with smoking and obesity. Yet distress in cancer can arise from a very wide range of issues, and require very flexible service responses, exposing the limitations of current conceptual models of distress, and their associated

therapeutic practices. This talk outlines the development and evaluation of a psychological skills training programme for cancer nurse specialists, informed by Method of Levels principles, that aims to meet some of this need.

Resolving Interpersonal and Intrapersonal Conflicts: A Comparison of the Practice of Mediation with Method-of-Levels Psychotherapy

Kent McClelland, Grinnell College, USA & Warren Mansell, University of Manchester

This paper compares and analyzes two ostensibly disparate fields of professional practice: the mediation of disputes and a psychological therapy called Method of Levels (MOL). Mediators address interpersonal conflicts, while MOL therapists help clients cope with intrapersonal conflicts. The academic literatures of the two fields have never overlapped. While the techniques of mediation were developed pragmatically, MOL derives explicitly from a psychological theory: perceptual control theory (PCT). The PCT account relies on understanding the nature of control, considering controlled experiences in a multi-leveled hierarchy from concrete (sensory perceptions) to abstract (values, ideals, principles), and appreciating the pivotal role of the depth and duration of present-moment awareness. We argue that, in spite of differences, the two fields of practice have many similarities, and we show how PCT works equally well to analyze the interpersonal conflicts addressed by mediation as the intrapersonal conflicts addressed by MOL. We argue that the two kinds of conflicts are, in fact, closely related. We conclude that the two fields of practice can be of mutual benefit to each other and that PCT can provide a useful theoretical foundation for both. Full paper submitted to Journal of Integrative Social Science.

Giving PCT away: pedagogy for sustainable learning

John Kirkland, David Bimler, Mike Saywell, Massey University, New Zealand

We open this presentation with a lightly edited version of Fig 14.1 (B:CP) (*Relationship of the reorganizing system to the behavioral hierarchy and physical environment*) which replaces drawn arrows with tuneable circuitry, includes additional intrinsic states, and proposes an individual-differences developmental perspective transitioning from fully-managed to self-regulatory care. This scheme provides a theoretical foundation for designing practical procedures teachers at all levels may utilise to assist, nudge, guide and advance a constructivist approach to student learning. A balanced set of nested leveraging tools available for teachers is described to complement student engagement of the learned hierarchy of control.

The Impact of Transformational Life Skills Based on Perceptual Control Theory

Shelley Roy, BE-Print, USA

A review of Transformational Life Skills taught in Mecklenburg County Jail and Schools across the U.S. Two main principles guided the development of this body of work, first was the alignment to key concepts of Perceptual Control Theory as originally described in the works of William T. Powers, specifically the levels of perception and the process of control. Secondly the design and delivery adhered to the latest research on brain-compatible instruction.

Each course consisted of an essential question and a standard accompanied by Assessment Tasks. In most cases, the essential question was “*What are the implications for applying Perceptual Control Theory (PCT) to becoming the person I really want to be?*” Courses varied in length but at a minimum consisted of 24 hours of face-to-face instruction spread

over several days. All participants were voluntary. In some situations, a progression of courses was offered (Level 1, 2, and 3). Additionally, some participants were involved in typically sessions, (e.g. Anger Management) or in practicum experiences. The highest ratio of participants to trainers was 18:1 in most cases smaller groups were formed for more individualized instruction and practice.

Instructional methods included: modeling, mini-lectures, demonstrations, role-play, the Method of Levels, meditation, journaling, self-reflection exercises, surveys, and inventories.

Using principles of PCT to transform the understanding & care of children & young people

Louise Mansell & Kirsty Hughes, Clinical Psychologists at Nurture Co-operative, UK

We provide mental health services to children, young people, schools, families and carers. We draw upon a number of therapeutic modalities (attachment theory, PACE, compassion focused therapy) but we integrate them in practice using PCT. There are a number of additional ways in which our approach is informed by PCT.

First, throughout our training and practice, we hold the principle that control is essential to well-being and mental health. We use this principle to explain why anxious children need to be listened to, to explain why environments need to be adapted for children's specific sensory and emotional needs, and to explain why there is always a higher level personal goal underlying what appears on the surface to be a 'problem behaviour'.

Second, we provide Method of Levels (MOL) as a client-led, client-scheduled, one-to-one intervention wherever it is needed: to children in high schools, to parents, teachers, and our own staff members. Each of these groups have valued the flexibility, honesty and personalised focus of MOL, and many have benefited.

Third, we have adapted the Take Control Course, a brief course based on perceptual control theory, for high schools. It helps the pupils to use the principles of control, conflict, going up levels, and reorganisation in their own lives, through interactive, experiential exercises. It builds on the adult version by incorporating art, music and film, as well using an MOL approach to exploration of a problem, and classic PCT demonstrations such as the rubber band demonstration. The course is currently being evaluated with promising results.

A whole-school approach using PCT and MOL to support emotional health and behaviour

Susan McCormack, Mode Rehabilitation & University of Chester, UK

MODE is local charity delivering psychological services to adolescents in schools in Stockport. Since 2015 Mode has piloted a "Whole School Approach" using Perceptual Control Theory (PCT) and Method of Levels (MOL) therapy to support schools in making a difference to the emotional health and behaviour of their pupils. Named "Single Point of Access", we offered weekly one hour sessions using dedicated materials based on adaptations of the "Take Control" resources and Method of Levels (MOL) therapy support for young people, families and teaching staff. Feedback from adolescents has identified a variety of benefits of the PCT framework.

PCT and Pedagogical Action in Education

Eetu Pikkarainen, University of Oulu, Finland

In my presentation I will compare the PCT based view(s) of education to the best developed wholistic theory of pedagogical action. The goal of this comparison is to develop a better and more accurate PCT based theory of education. The mentioned theory of pedagogical action is developed mainly by D Benner and K Mollenhauer on the basis of the "General Pedagogy" tradition in German speaking Europe. What is peculiar for this tradition is the (German language based) differentiation between two main concepts: Erziehung (education, upbringing, teaching) and Bildung (formation, learning, growth). These poles were famously contrasted by Kant in his dictum: How is it possible to cultivate freedom by using constraints? This problem, afterwards called the pedagogical paradox, has two partial and insufficient solutions, namely selecting the one or the other pole. But instead, genuine pedagogical action requires that they must both be reconciliated as a one whole. There seems to be a strong tendency in PCT thinking to prefer the latter half of the whole, the Bildung, learning and freedom side. There are good theoretical foundations for this kind of thinking. For example, Carey in his fine book about school teaching says that "teachers should minimize the extent to which they act as disturbances to students. (72)" But there is also another kind of possibility to infer that learning as reorganization takes place when there is an error in the controlling system and the only way to create an error to the system is to act as a disturbance to it. I will explain how the pedagogical paradox is planned to be solved in the theory of pedagogical action and then how this solution could be detailed and concretized by PCT conceptions.

The frontiers of interdisciplinary research using PCT

Warren Mansell, University of Manchester, UK

In this presentation I will provide an overview of the interdisciplinary nature of perceptual control theory, focusing on two themes. First, I will provide some illustrative examples of areas in which an interdisciplinary approach is necessary to spearhead scientific advances. I will describe the work I have been involved with that uses PCT to integrate psychology with: (a) robotics, (b) nature engagement and (c) theatre/film. Second, I will summarise the content and approach of *The Handbook of Perceptual Control Theory: Living Control Systems IV*. This is an interdisciplinary collation of contemporary work on PCT, published by Elsevier by early 2020. All contributions are complete and the book is with the publishers for proofing and printing.

Mathematical Approaches to Understanding (and Misunderstanding) Behavior

Richard Kennaway, UEA, UK & Rick Marken, Los Angeles, USA

Description of intended content: While open loop systems (such as the solar system) can be understood by observing mathematical regularities in their overt behavior (such as Kepler's laws), closed loop systems (such as people) can be understood only by determining the mathematical characteristics of their covert behavior (the perceptual variables they control; Powers, 1978). In this talk we will discuss four examples of mathematical regularities in the behavior of closed-loop systems that have resulted in misunderstanding the nature of the system that produced that behavior: Linear Optical Trajectory, Power Law of Movement, Movement Velocity Profiles, and Gait Planarity. We will show that all these behavioral "laws" can be understood to be an irrelevant side effect of the system's behavior once one has the correct mathematical definition of the perceptual variable(s) the system is controlling.

Trapping perceptions in the wild: a field report

Bruce Nevin, Massachusetts, USA

The phenomenological method that Bill used to propose and name levels of a perceptual hierarchy requires observing perceptions without resort to language, then analyzing and describing from memory, analogous to Wordsworth's recollecting strong emotion in tranquillity. These are fundamental phenomena of PCT, but few have replicated the work. His proposals for category, sequence, and program control were shaped by tacit assumptions about symbols and language. This is a brief report of field observations of sequence perceptions in the wild.

Colour perception: applying PCT ex post facto

John Kirkland & David Bimler, Massey University, New Zealand

In this presentation we introduce Munsell's familiar colour-perception model. Then we proceed to summarise four published studies utilising a novel approach derived from this model's architecture. Of interest here, it was only after publishing our innovative approach for assessing colour vision distortions in different populations that we became aware this method has close ties to PCT. We discuss these associations. In particular, a. how each trial required resolution of a conflict addressing satisfaction of a reference, and b. that on-board equipment malfunction, whether in-born (genetics; twins or "colour-blind") and acquired (nicotine) affect perceptual functioning. We explain how this procedure is closed- rather than open-loop and conclude on the importance of recognising outliers and rejecting perceptual functions' equipotentiality.

Applying PCT to hand hygiene

Jonathan Sigger & Tom Dickins, Department of Psychology, Middlesex University

Our own introspections and observations show we wash our hands in different ways on different occasions – even within same environment such as a toilet. Research evidence shows that hand hygiene is highly variable between individuals and even varies on a global scale between nations. In settings such as hospitals, food preparation industries and public toilets etc., the variability of hand washing has unintended consequences for individuals and communities because it spreads deleterious organisms responsible for diseases such as gastrointestinal (GI) and respiratory tract (RT) infections.

In this paper we propose that the far-reaching fundamental insights of PCT can be applied to understanding hand washing – that people control for the perception of having 'clean' hands and behaviour is the variable means by which people control the perception of having 'clean hands'. We nominate likely controlled variables in the hierarchy and discuss some of the implications for health interventions.

Militarism and the Authoritarian Personality: Displacement, Identification, and Perceptual Control

Brian D'Agostino, New York, USA

This article builds on a unique data set in which self-perception and militarist ideology were operationalized using separate instruments in the same survey. An empirical foundation is presented using this research's findings on White male gender insecurity, authoritarianism, and militarism as well as findings from other survey research on the effects of punitive parenting on adult psychology. These data are interpreted in light of the psychoanalytic concepts of displacement and "identification with the aggressor." Then, pursuant to Freud's

project of a brain-based science of the unconscious, the foregoing are discussed in the language of Perceptual Control Theory, which describes the general structure and dynamics of motivation, perception, and behavior and which interfaces with cognitive neuroscience. The article concludes with implications for clinical practice and social transformation.

Link to full paper: <https://bdagostino.com/resources/JASPER%202019%20article.docx>

A PCT View of Money

Martin Taylor, Toronto, Canada

The presentation is in six parts: (1) Introduction to the basic concepts of the “motif”, the “PCT motif” and the “PCT Trade motif”, together with definitions of the key perceptions used and controlled in the Trade motif — One’s own Worth and the Value of an option, both of which are personal and time-variable, and neither of which has an external referent accessible to others. (2) An examination of the Trade motif, which consists of a pair of independent two-level hierarchies, each of which controls Worth at the upper level and two Values at the lower level. The four Values in the two hierarchies are perceptions of the contribution to the two independently controlled Worths of the same two externally observable entities. (3) IOUs as avatars of the Valued entities, and Trading in IOUs. Trade in IOUs involves more risk than barter of goods or services. (4) Introduction of a Universal IOU that can be traded for specific IOUs, a kind of embryonic Money. (5) Relationship of Money to work and physical energy, structure created by work, the universal decay of structure and to the maintenance of structure through perceptual control. Universal IOUs progressively mature into becoming money by way of banking and lending. (6) What IS Money, according to PCT? Money is not banknotes, coins, gold bars or cowrie shells. It is a language of value, used in the Trade motif to greatly ease trade in the way that the language of voice, sign language, and writing eases communication both synoptically and through time.

Perception in the generation of hierarchical control structures: a new methodology to derive hierarchies in robots from real world experience

Ben Hawker & Roger K Moore, University of Sheffield, UK

Controllers, even of a simple nature, are used to produce solutions to real world problems. As problems become more complicated, solutions to produce more refined and robust behaviour are required. As solutions scale up, understanding of the behaviour of the system is more challenging. Perceptual hierarchies simplify the problem through focusing on the perceived components of behaviour (and its effects) that matter to the organism in terms of fulfilling its superordinate goals in the hierarchy. Hierarchical control systems, which are compatible with perceptual hierarchies, have long been a strong choice within control theory but with no fundamental understanding how what constitutes or makes said hierarchy. This talk explores the place of hierarchies in control theory and how an understanding of the structure and origin of a hierarchy can make the behaviour of a system more understandable.

This talk proposes a method of developmentally producing hierarchical layers of controlled perceptions leading to simple solutions to complex control problems, named ‘The Dependency Oriented Structuring Architect’ or DOSA. By agents understanding the dependencies of one skill or behaviour on another, an agent can progressively build skills to eventually produce complex behaviour that is robust. This is done by deriving a hierarchy of controllers, beginning with nothing more than the inputs and outputs of the system. This process can be implemented in an artificial agent to produce progressively developed solutions to problems. This aids in reducing the complexity of balancing a large number of control parameters as well as making the solution easier to understand.

Small group discussions on PCT

Eva de Hullu, Open University, Netherlands

My idea is to spark conversations between conference attendees around areas in PCT and MOL that need clarification. Participants discuss subjects in small group, and afterwards the results of these discussions are presented in a plenary discussion.

We start by explaining the goal of the discussion: to allow participants to share their questions and knowledge in small groups, and thus allow all participants to add to the discussion. This could improve future collaboration and exchange of knowledge, and limits the pitfalls of the ‘expert panel’.

Participants are randomly divided into groups of max 5 persons.

The purpose of the small group meeting is to discuss an aspect of PCT that keeps them busy: follow your error. What idea or question in the conference sparked your interest and keeps you awake? A few examples will be provided at the start, in case participants can’t come up with their own ideas: how can we increase attention for PCT in science? How do we connect with other (e.g. Friston) scientific communities that share some of our ideas? What can we learn from PCT robots?

In the small group, participants start by collecting these questions and decide which question they will focus on in their discussion. They discuss the question, in a MOL/PCT way: what part puzzles you? Why? How? What do you know? What don’t you know? Are there differences in opinion? Explore all sides. The idea is that by elaborating on these questions, new ideas or actions will spring to mind.

The session ends by plenary collection of the central questions and ideas of each group and wrapping up by providing some general remarks.

Experiences across the perceptual hierarchy

Eva de Hullu, Open University, Netherlands

In this poster I will present a diagram of the perceptual control hierarchy, visualizing several aspects of Perceptual Control Theory. In this presentation of the proposed eleven levels of perceptual control in humans and conceptualizing relations between levels, as well as describing the experiential aspects of control and loss of control at each level, I invite colleagues to discuss the workings of the perceptual hierarchy.