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On Developmental Transformations and Neural Integration: A Literature Review

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Abstract

This thesis presents developmental transformations (DvT) and explores this technique's connections with neural integration. Developmental transformations is an improvised drama therapy technique (Johnson, 2013). Neural integration is what occurs when the different parts of the brain are working together (Siegel, 2020). Domains of integration are the different parts of the mind that are attempting to work together (Siegel, 2010a). This thesis aims to demonstrate how elements and techniques of DvT may facilitate neural integration. Background in both areas is provided, then specific concepts, skills, and methods of developmental changes are connected to domains of integration. Practical applications are reviewed, and future directions and limitations are touched on.

Key Words: developmental transformations, playspace, embodiment, encounter, transformation, varielation, neural integration, interpersonal neurobiology, domains of integration

Author Identity Statement: The author identifies as a cisgender, heterosexual, White female from the Midwest of varied European descent.

On Developmental Transformations and Neural Integration: A Literature Review

Introduction

This literature review investigates developmental transformations (DvT), a drama therapy approach, and the connections it shares with the concept of neural integration. From this, a primary focus of this paper will center on how DvT practitioners may benefit from including neural integration in the theoretical framework from which they operate. Developmental transformations is defined as an embodied and improvised drama therapy technique that encourages flexibility and builds self-confidence in clients to deal with unstable situations, such as times when the future may seem uncertain (Johnson, 1982, 1991, 2013; Johnson & Pitre, 2021). Interpersonal neurobiology (IPNB) is the overarching field from which the idea of neural integration comes from that intends to help clinicians understand clients better (Siegel, 2020). Neural integration is what occurs when all the different parts of the brain are work together to help people manage their emotions more effectively (Siegel, 2020).

There is rich literature defining both DvT and neural integration as separate topics that on the surface may seem unrelated to each other, however, it is clear from this literature that they do indeed share a common goal of increasing flexibility for clients (Johnson & Pitre, 2021; Siegel, 2010b). Siegel's (2001, 2009, 2010a, 2010b, 2013, 2020) work emphasizes that when the different parts of the brain work together, clients function better emotionally overall. An intervention such as DvT that focuses on flexibility may be able to target the different parts which may lead to the parts working better together which may, in turn, help clients regulate themselves more successfully (Butler, 2012; Johnson & Pitre, 2021; Wood & Schneider, 2015). Developmental transformations is an approach that provides clients with opportunities to practice dealing with the lack of control they have over life by encouraging them to become better

connected to their bodies and to the people around them which may lead to the rewiring of the brain (Butler, 2012; Siegel, 2020).

With these commonalities in mind, this capstone thesis considers the brain and how differentiated neurons may link together while clients are participating in DvT, a still unknown factor. Similarly, it would be important for DvT practitioners to have an idea of what is going on in the brain while practicing because it would allow them to have a fuller and more in-depth understanding of their clients and their human experience. Moreover, the field of IPNB would benefit from having a complete understanding of DvT because it is a technique that is intentionally attempting to increase flexibility for clients, the underlying goal of both DvT and interpersonal neurobiology (Johnson & Pitre, 2021).

Through the process of researching and writing this thesis, I have learned more about the connections between the body, the brain, and the human experience. I have discovered more about how neural integration can inform DvT and how it is utilized with clients as well as how DvT can inform neural integration and interpersonal neurobiology. I have learned more about how the brain operates and how that can impact DvT practice and can now incorporate it into my clinical practice. I hope that this thesis will inspire more research on both DvT as a technique and how neural integration happens, as well as how DvT can be utilized within an IPNB framework.

First, an introduction to the developmental paradigm will be provided to contextualize developmental transformations. Then history and description of the theory behind DvT are presented along with the current orientation of DvT for review. Developmental transformations skills and techniques as well as populations that benefit from DvT are explored. Next, IPNB is differentiated from neural integration, and the domains of integration are defined. Furthermore, the connections between DvT and neural integration within IPNB are drawn. Finally, a

discussion of practical applications of DvT in a IPNB framework for future clinical use is presented.

Developmental Transformations

The Developmental Paradigm

Developmental transformations is a technique that situates itself within the developmental paradigm (Johnson, 1982). The developmental paradigm proposes that being a person is a process during which the future is informed by the past while developmental stages are completed (Levinson, 1978; Piaget, 1954). This idea differs from non-developmental world views in that many of these views categorize human beings as being one thing or another without room for growth or change (Johnson, 1982). Whereas the developmental paradigm simply proposes that the process of becoming an individual continues throughout their entire life (Johnson, 1982).

Theory of Developmental Transformations

Developmental Transformations Definition

Developmental transformations is an improvisational technique that has been adapted from theatre to a more therapeutic setting (Johnson, 1991). During a DvT session, the client and therapist work together to continuously improvise what is happening and to steadily move from one scene to another. What comes up during DvT is typically derived from the client's past and is indicative that the client is processing in a way that may be similar to what is seen in a more traditional talk therapy session (Johnson, 1991).

Theoretical Concepts

Historically, three basic theoretical concepts provide the foundation for developmental transformations (Johnson, 1991). The first is the idea that development facilitates the distinction

of self from the rest of the world. However, people's full selves are not always available to them which means that people do not fully experience themselves most of the time. This ability to separate oneself from the rest of the world is crucial to ensuring a person's adaptability (Johnson, 1991).

The second concept is the idea that clients' perceptions of themselves and others create their realities that are unfinished and subject to change (Johnson, 1991). These representations go through both the processes of differentiation and integration. Differentiation is when experiences are separated from one another while integration happens once these experiences make connections between them. Once these processes take place, development aids clients by beginning to parse out the differences and similarities between their perceptions as they become more and more complicated. Through development over time, clients gain a better understanding of other people in the sense that people can still be generally good people and make mistakes as well as adapt to more nuanced patterns of thinking (Johnson, 1991).

The third concept is the idea that the world is constantly changing (Johnson, 1991). Individuals' feelings, thoughts, and images are ever-changing while their representations of the world as a whole transform as time goes on (Johnson, 1991).

Core Elements

Moreover, the three core elements that comprised DvT when first founded were the playspace, flow, and impasse (Johnson, 1991). The playspace was defined as a place that was intentionally different from the outside world in which anything could happen when clients participated in developmental transformations. Flow was experienced when participants connected to both their personal representations and feelings while simultaneously connecting to what was going on in the playspace. Impasse was experienced when the needs of a scene

conflicted with what participants wanted which led to interference with the flow. For example, if participants were unable to go with the flow in the playspace due to feeling attached to a pattern of behavior then they had reached an impasse and participants resolved this by leaving the playspace or by someone breaking character (Johnson, 1991).

Primary Distortions

Differentiation and integration are crucial because they aid people's development of a sense of self (Johnson, 1982, 1991). However, at times efforts that are meant to protect this sense of self actually lead to cognitive distortions that are unhealthy. The three primary distortions are constriction, rigidity, and negativity. Constriction occurs when the self is narrowly defined and does not allow personality traits such as being flexible to be incorporated into a person's sense of self. Rigidity occurs when people are not able to tolerate the unknown using flexible responses. Finally, negativity occurs when the self is characterized by trauma. These three distortions can lead to dysfunctional human beings (Johnson, 1982, 1991).

Goals

The goals of DvT are to guide clients toward more flexible responses in life by sifting through their experiences and then figuring out how to relate to them (Johnson, 1982, 1991). To counteract constriction, DvT works toward helping participants express themselves fully instead of concealing their emotions. As opposed to maintaining a rigid self-definition, DvT's goal is for clients to be able to attune to themselves and their surroundings along with managing the unknown so that they may have more flexibility when dealing with new situations. Another goal is to help clients accept themselves as well as to be able to move on from mistakes they and others have made (Johnson, 1982, 1991).

Current Orientation and Practice of Developmental Transformations

Developmental transformations is a current approach used in drama therapy during which clients, also known as players, are encouraged to play with the therapist, also known as a playor, in an improvised manner along with anyone else in a group (Johnson, 2013; Johnson & Pitre, 2021). During this play, players are given the opportunity to play with aspects of life that were previously thought of as unplayable (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021). Those who practice DvT work primarily from the idea that every moment is completely unique (Johnson, 2013; Johnson & Pitre, 2021). Therefore, the overall goal of DvT is to increase players' abilities to deal with life's uncertainties, which includes but is not limited to players' relationships with others (Johnson, 2013). This means that there is some risk when participating in this approach because, similar to increasing physical flexibility, some discomfort may be necessary in order to increase emotional flexibility (Johnson, 2013).

Within this overarching goal, DvT aims to prepare participants for the stipulations of those they have personal relationships with as well as the stipulations of the overall world around them (Johnson & Pitre, 2021). Developmental transformations achieves this by giving players multiple opportunities to practice responding flexibly to situations they may have never experienced before (Johnson & Pitre, 2021). Players may then become more comfortable with the unknown and are able to overcome life's obstacles (Johnson & Pitre, 2021).

Developmental Transformations and Clinical Practice

Developmental transformations has been used "in a wide variety of settings, including inpatient hospitals, outpatient clinics, substance abuse and rehabilitation programs, nursing homes, and private practice clinics" (Johnson & Pitre, 2021, p. 154). Developmental transformations can be practiced in both group and individual settings over both long and short periods of time (Johnson & Pitre, 2021). Developmental transformations has been employed by

therapists working with clients with "schizophrenia, substance use, posttraumatic stress disorder, sexually abused children, homeless mentally ill, elderly, violent men, and the normal neurotic" (Johnson & Pitre, 2021, p. 154). Additionally, the DvT therapist should work with their clients to come up with and work toward specific goals while keeping in mind how long they will be working together and the level of care the therapist is providing (Johnson & Pitre, 2021). However, DvT "is not well-suited for addressing highly specific symptoms or issues (e.g., obsessive-compulsive disorder, phobias, psychotic symptoms, achieving sobriety, and decision-making around divorce)" because they typically require a more explicit approach (Johnson & Pitre, 2021, p. 154).

Playspace

Playspace is now defined as a space that players and the playor enter together with the understanding that everything that happens in this space is not real (Johnson, 2013; Johnson & Pitre, 2021). This understanding is reached by the participants through movements in their bodies and faces that are more exaggerated compared to how they would move outside of the playspace so that everyone is on the same page regarding the play. Another important element of playspace is discrepancy. This means that it must be clear to all in the playspace that what is happening is not real. The discrepancy within the playspace may adjust to the participants' needs in that some groups may need more discrepancy and others may need less (Johnson, 2013; Johnson & Pitre, 2021).

The third important element of the playspace is the idea that anything that happens in the playspace is reversible (Johnson, 2013; Johnson & Pitre, 2021). This means that anything that is said or done by the players or playor can be changed by someone else. It also means that players

may have the chance to play with power dynamics and play powerful roles that they may not get to play in real life because of societal rules (Johnson, 2013; Johnson & Pitre, 2021).

Core Principles

Based on the way DvT is currently practiced, there are three core principles: embodiment, encounter, and transformation (Butler, 2012; Johnson, 2013). As mentioned above, players and playors must participate in the physicality of DvT sessions (Butler, 2012; Johnson, 2013). This physical movement should be intentionally bigger and bolder than movements done outside of DvT sessions because it allows patterns of behavior to be brought to the surface while bypassing defense mechanisms (Johnson, 2013). Sessions also require players to be close to one another to expose them to instability which can be experienced when near and in relationship with others (Johnson, 2013). Additionally, touch is an important part of embodiment because it is a part of everyday life and can be a part of DvT sessions if consensual (Johnson, 2013).

During DvT players are also encouraged to focus on the encounters they have with each other instead of what may be going on in their heads (Johnson, 2013). As previously touched on, being in relationship with others can cause instability therefore, to minimize distractions from the encounter, props or objects are not used (Johnson, 2013). Props provide an opportunity for participants to project onto them instead of projecting onto the other members of the group which would interfere with the encounter (Johnson, 2013). Thus, the lack of props or objects compels participants to encounter each other and find ways to cope with the consequences (Butler, 2012).

Transformation is experienced by participants when the scenes that are being acted out progress and change over time leading to the players confronting new things which may challenge their flexibility (Butler, 2012; Johnson, 2013). Various elements of the action may be

changed depending on the connections the players make to their own inner processes during a DvT session (Butler, 2012; Johnson, 2013). The element of transformation favors players moving from one scene to the next without getting too attached to a particular role or scene (Johnson, 2013). This means that DvT encourages players to constantly change what is going on and each change may bring a new set of challenges that all must adapt to (Johnson, 2013). Through embodiment, encounter, and transformation, DvT allows players to practice enduring instability and uncertainty so that they can become more flexible in their responses to those around them and the outside world (Butler, 2012).

Developmental Transformations Skills and Techniques

In addition to the three core principles that comprise DvT, there is a core skill of responding in the moment (Johnson, 2013; Johnson & Pitre, 2021). This ability is honed by practicing the recursive cycle with the steps of noticing, feeling, animating, and expressing, and is similar to what people might think of when a natural conversation is flowing (Johnson & Pitre, 2021). For example, if two people were having a conversation the first person may share some news, then the second person might have an internal response to that news and then verbally respond, leading back to the first person reacting to their response (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021). By practicing the recursive cycle, DvT practitioners are able to provide clients with the most diverse experience possible in the playspace so that they are not held back by the practitioner's personal communication preferences (Johnson, 2013; Johnson & Pitre, 2021).

There are four types of techniques used in DvT, each is defined by how much discrepancy comes from what the player is doing vs. what the playor provides: mirroring, faithful rendering, emergent varielation, and divergent varielation (Johnson, 2013; Johnson & Pitre,

2021). Mirroring or convergent varielation is when the playor copies what the player is already doing, which means that the playor notices the player's behavior and joins the player as best they can (Johnson, 2013; Johnson & Pitre, 2021). For example, if the player begins to hop on their right leg, then the playor will attempt to mimic how the player is hopping on their right leg to the best of their ability. Faithful rendering or congruent varielation is when the playor acts in a way that may be perceived as logical in response to what the player is doing (Johnson, 2013; Johnson & Pitre, 2021). If the playor chooses to faithfully render a scene, they would take note of what may be missing and try to provide that element as best they can (Johnson, 2013; Johnson & Pitre, 2021). An example of this would be if the player began to put makeup on the playor then the playor would acknowledge this act and maybe ask what shade of lipstick would look best.

Emergent varielation is when the playor notices what the player might be feeling in the playspace and tries to reflect it back to the player which would provide the player with an opportunity to transform what is happening (Johnson, 2013; Johnson & Pitre, 2021). When the playor chooses emergent varielation in the playspace it typically means that they are doing something different from what is going on in the playspace (Johnson, 2013; Johnson & Pitre, 2021). For example, if the player and playor were doing a scene in which the player became a mother and the playor picks up on the player's feelings of fear or terror of becoming a mother, then the playor might take on the role of a zombie baby. Divergent varielation can be any behavior that is different from what is currently going on in the scene (Johnson, 2013; Johnson & Pitre, 2021). This includes when the playor makes "subtle variations in the portrayal of a dramatic element in terms of intensity, proximity, or timing" (Johnson, 2013, p. 74). An example of divergent varielation would be if the players were doing a scene in which they were meditating and the playor suddenly comes running through the scene squawking like a chicken.

Neural Integration

Interpersonal Neurobiology and Neural Integration

Interpersonal neurobiology is a field that incorporates information from several different fields to inform their practices by combining pieces of information, and by being able to enhance the comprehension of clients' minds (Siegel, 2020). A key idea within IPNB is that new pathways in the brain can be created by connecting with others and with ourselves (Siegel, 2020; Wood & Schneider, 2015). Interpersonal neurobiology also proposes that certain parts of the brain play particular roles and it can be disorienting for clients if these parts do not collaborate. Moreover, within IPNB the neocortex is the primary part of the brain that is responsible for organizing the new information it gets every day along with the daily activities of living (Siegel, 2020; Wood & Schneider, 2015).

Within the field of IPNB, integration is broadly defined as making connections between various parts, which is an important function of the brain because it may impact a client's overall well-being (Siegel, 2020). If clients are experiencing chaos or rigidity, it may be because their brains are struggling with integration (Siegel, 2020). More specifically, neural integration is when neurons that perform various functions are connected to each other so that all the different areas of the brain can work more efficiently together, clients may be better able to regulate themselves (Siegel, 2020). The overall goal of neural integration is for clients to connect better with others by becoming more flexible and understanding of their emotions (Siegel, 2020; Wood & Schneider, 2015). This rewiring of brain may lead to clients breaking free of old patterns of behavior that are unhealthy (Siegel, 2020; Wood & Schneider, 2015).

Mind

In Siegel's (2020) work, the mind is comprised of four components. These components are "(1) personal subjective experience; (2) awareness; (3) information processing; and (4) a regulatory function that in an emergent, self-organizing, embodied, and relational process of the extended nervous system and relationships" (Siegel, 2020, p. 507). This final component of mind is responsible for how energy and information is utilized. The field of IPNB proposes that the concept of the mind combines what is physically happening in the brain with what a client's body experiences and how they operate in relationships (Siegel, 2020).

Domains of Integration

For the sake of readability and clarity, the language of Wood and Schneider (2015) is used instead of Siegel's (2010a) to ensure readers' understanding of the domains of integration. Integration is facilitated by methods that process experiences "through intrapersonal and interpersonal attunement in eight domains: consciousness, horizontal, vertical, memory, narrative, state, interpersonal and temporal" (Wood & Schneider, 2015, p. 58). When these domains of integration work in tandem, neural integration can be achieved which can aid clients with self-regulation (Siegel, 2010a; Wood & Schneider, 2015). In particular, these domains are:

Table 1

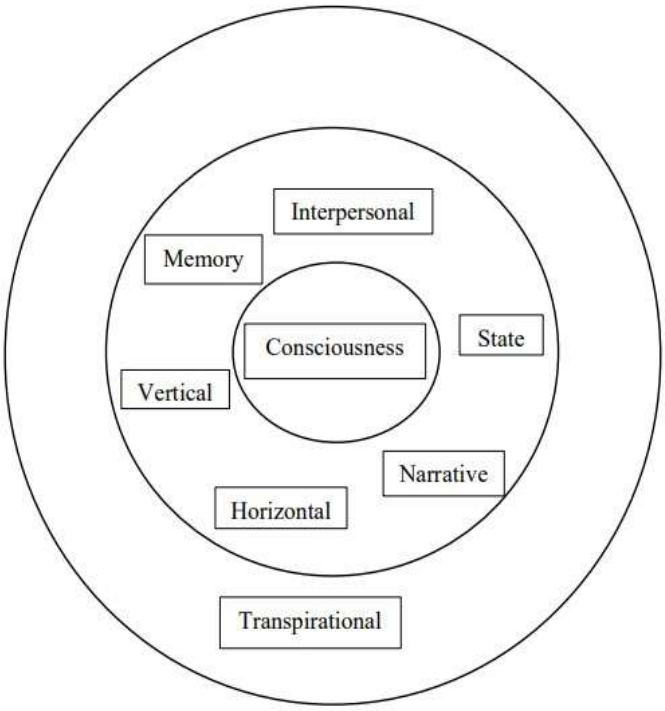
Domains of Integration Definitions

Integration of consciousness:	"Increases the ability to maintain attention and awareness to acknowledge the world as it is without being overwhelmed by strong emotional states" (Wood & Schneider, 2015, p. 58).
Horizontal integration:	"Allows for a coherent sense of previous events by integrating right brain processes (e.g., imagery, nonverbal communication,

	autobiographical memory) and the left-brain processes (e.g., logic, spoken and written language, linear thinking)" (Wood & Schneider, 2015, p. 58).
Vertical integration:	"Increases cohesiveness between the systems of the brainstem, limbic system, and neocortex" (Wood & Schneider, 2015, p. 58).
Integration of memory:	"Increases the ability to live in the present moment without intrusion of past emotional and body reactions, particularly when traumas or neglect have previously remained in implicit memory without being tied to the events" (Wood & Schneider, 2015, p. 58).
Narrative integration:	"Works on integrating past memories without constriction or denial of events in order to avoid repeating cross-generational patterns that limit one's flexibility in making life choices" (Wood & Schneider, 2015, p. 58).
State integration:	"Increases the awareness of fundamental needs such as autonomy vs dependence and closeness vs separateness, particularly when the person has had maladaptive responses to situations where their needs were not met or punished, creating inflexibility or shame" (Wood & Schneider, 2015, p. 58).

Interpersonal integration:	"Allows one to remain attuned to self while remaining connected to others, while increasing awareness of the impact previous interpersonal injuries on the ability to do this" (Wood & Schneider, 2015, p. 58).
Temporal integration:	"Increases one's ability to tolerate fear, uncertainty and the fear of death, without becoming paralyzed or desperately needing to control it" (Wood & Schneider, 2015, p. 58).

Figure 1



Note. Adapted by adding boxes around the words from *The mindful therapist: a clinician's guide to mindsight and neural integration*, by D. Siegel, 2010b, p. 238. Copyright 2010 by Mind Your Brain, Inc.

More specifically, as seen above in Figure 1, it is important to promote integration of consciousness because it nurtures clients' abilities to tell the difference between the activity of the outside world from self-awareness (Siegel, 2010b). If clients can master distinguishing between these two, then clients may be able to be more present with the people they have relationships with. Horizontal integration occurs when the right and left sides of the brain are actively working together. Both sides of the brain participate in this kind of integration, even parts of the nervous system that are physically far away from each other but still on the same side of the brain participate in horizontal integration (Siegel, 2010b).

Vertical integration occurs when the mind is notified about information received by the body, while memory integration makes it easier to retrieve information (Siegel, 2010b). The goal of narrative integration, on the other hand, is "about weaving the observer with the observed, of intimately linking bodily experience and the non-verbal realm of right-mode processing with the logical, linear, linguistic, and observing left mode processes" (Siegel, 2010b, p. 244). Finally, this process is important because it encourages people to feel fully connected to themselves and the world around them (Siegel, 2010b).

State integration happens when the elements that people define themselves by, also referred to as a self-state, are connected to create a sense of self (Siegel, 2010b). For example, people may have self-states for when they are participating in hobbies, at work, spending time with friends and family, and/or when out on a date and the goal of state integration is for these self-states to collaborate with each other (Siegel, 2010b). Interpersonal integration assists people in balancing both an individual sense of self as well as being a responsible citizen of the world. This idea of taking an active role in the world at large can help individuals to organize the various processes going on within themselves. This feeling of being connected to both self and

others may also be a key component to consider when treating clients. Finally, temporal integration encourages the acceptance of the fact that seeking stability in life is not realistic and becoming comfortable with the unknown (Siegel, 2010b).

According to Siegel (2010b), after the eight domains of integration have been achieved, a ninth kind of integration emerges as seen in Figure 1: transpirational integration. Transpiration means understanding that everyone and everything are connected to each other and understanding that all individuals play a role in the world. With this deeper understanding of themselves and the world around them clients may gain insight into their internal and external experiences. Clients can then connect these domains to each other to achieve neural integration. When clients achieve this neural integration within themselves, they are able to grow as people to accept the way that life operates and play their role in the world to the best of their ability (Siegel, 2010b).

Developmental Transformations and Neural Integration

Developmental transformations and neural integration have previously been concepts that have only been studied separately, however, they both intend to increase flexibility for clients (Johnson, 1982, 1991, 2013; Johnson & Pitre, 2021; Siegel, 2001, 2009, 2010a, 2010b, 2013, 2020). With this in mind, DvT may target the domains of integration which may result in clients being able to regulate themselves better (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2009, 2013, 2020; Wood & Schneider, 2015). By utilizing DvT to manage clients' domains of integration, clients may also be able to participate in the world around them more because they may be able to distinguish their internal processes from external processes as well as decrease their fear of the unknown (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2009, 2013, 2020). The

following paragraphs demonstrate how several elements of DvT may facilitate neural integration (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2009, 2013, 2020).

Playspace and Neural Integration

The playspace is an important part of how DvT may facilitate neural integration because it provides an opportunity for the client and therapist or player and playor to simulate the chaos of the outside world within a safe container and with discrepancy (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010b, 2013, 2020). This includes patterns clients have found throughout their lives and since everything in the playspace is playable, a DvT practitioner can challenge these patterns and provide the player with the chance to try something new in a safe space (Johnson, 2013). Being presented with this kind of challenge may promote memory integration because the playspace encourages the player to live in the moment (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). By being in the playspace together, players must be attuned to each other to ensure discrepancy and mutuality is maintained when in a group (Johnson, 2013; Johnson & Pitre, 2021). This means that players may be able to promote the rewiring of their brains based on attuning interpersonally to the other players, the playor, and the environment around them (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020).

The subtle signals that are used to maintain discrepancy are not only important to DvT but also may allow players to practice consciousness and interpersonal integration because they are an opportunity for players to practice being aware of the world around them while staying attuned to those in their immediate vicinity (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2013, 2020). Equally important, the unpredictability of the playspace due to the scenes being improvised sets the stage for players to potentially facilitate temporal integration so that

players may increase their threshold of tolerance for uncertainty (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2013, 2020).

Core Principles and Neural Integration

Embodiment

As mentioned above, an important pillar of DvT is active use of the body by both the player(s) and the playor with the body becoming the primary focus of the play at times (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021). This aspect of DvT may be crucial to facilitating horizontal integration because it actively engages both the right side and left side of the brain (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). Moreover, vertical integration may be linked to the embodiment piece of DvT in the sense that players must be aware of the signals their bodies are sending, as well as the nonverbal signals of the bodies of other players and the playor (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). This means that because of the embodied nature of DvT, both horizontal and vertical integration may be facilitated while players are participating (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). This could then contribute to overall neural integration leading to the brain functioning better and a more flexible client (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020).

Encounter

The encounter that DvT encourages may be essential to the promotion of memory, interpersonal, and temporal integration (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2013, 2020). By intentionally bringing their attention to the encounters with others they are having in the moment as opposed to their inner processes, both memory and interpersonal integration may take place while players are participating in developmental

transformations (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). Memory and interpersonal integration may take place because memory integration helps individuals to live in the moment on a personal level while interpersonal integration paves the way for people to connect to others (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). Similarly, since being in relationship with others can be an anxiety-inducing part of life, the encounter component of DvT may aid temporal integration (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). By targeting these domains of integration, it is another part of the practice of DvT that may aid neural integration for clients (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020).

Transformation

Additionally, the improvisational nature of DvT that leads to consistent change during sessions may target narrative integration, state integration, interpersonal integration, and temporal integration in a few ways (Johnson, 1982, 1991, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). This focus on transformation during sessions may address rigidity and defenses of players, which may attend to temporal integration (Butler, 2012; Johnson, 1982, 1991, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). Transformation also may facilitate narrative and interpersonal integration because the play can be changed in an instant which means that players need to be acutely aware of each other and their bodies need to be in a heightened state to be ready for that change (Butler, 2012; Johnson, 1982, 1991, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020). Transformation may aid state integration as well by providing the opportunity for players to figure out what they need for the scene that is playing while also paving the way for new self-states to be brought forward (Butler, 2012; Johnson, 1982, 1991, 2013; Johnson & Pitre, 2021; Siegel, 2010a, 2010b, 2013, 2020).

Developmental Transformations Techniques and Neural Integration

The playor's skill of responding in the moment may be vital to the integration of multiple domains in the brain such as interpersonal and temporal integration (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2009, 2010b, 2020). The playor provides the opportunities for players to respond to situations in new ways and adds to the uncertainty that players may need to expose themselves to have more flexibility in life (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2009, 2010b, 2020). The playor is also another person that the players need to be attuned to (Butler, 2012; Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2009, 2010b, 2020).

Moreover, certain techniques within DvT may encourage the interpersonal attunement of players to each other or may encourage flexibility in responses and increase tolerance of uncertainty which in turn could facilitate neural integration (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2009, 2010b, 2020). For example, when a playor mirrors what the player is doing during play, the playor is completely attuned and provides the least discrepant information possible which could attend to interpersonal integration (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2009, 2010b, 2020). Similarly, through congruent varielation, the player and playor are both aware of themselves and each other which could assist in interpersonal integration (Johnson, 2013; Johnson & Pitre, 2021; Siegel, 2009, 2010b, 2020).

However, techniques such as emergent varielation and divergent varielation which can spark transformation within the scene and provide a space for players to practice tolerating uncertainty may increase temporal integration (Johnson, 2013; Siegel, 2010b). By practicing tolerating uncertainty, players may be able to help train their brains to create new pathways that improve their ability to self-regulate (Johnson, 2013; Siegel, 2009). This may lead to players

having more flexible responses to their own feelings and circumstances (Johnson, 2013; Siegel, 2009). Through the collaboration of all the different parts of the brain, players may become more open toward the people around them and the world and are better able to adapt to unexpected changes (Butler, 2012; Siegel, 2010b).

Discussion

In summary, I have found that DvT and neural integration appear to have an overall common goal of increasing the response flexibility of clients (Johnson, 2013; Siegel, 2020). Elements of DvT such as playspace, embodiment, encounter, transformation, responding in the moment, mirroring, faithful rendering, emergent varielation, and divergent varielation may target the domains of integration that facilitate neural integration. If clients are then able to make more connections between the different parts of their brains, then the parts may work better together resulting in thriving human beings (Johnson, 2013; Siegel, 2020).

Practitioner Benefits

Practitioners of DvT would benefit from including a cognitive lens in their work because it creates a more complete picture of the client (Frydman, 2017). Similarly, DvT practitioners could also have a better understanding of their clients by considering neural integration when working with them (Johnson, 2013; Siegel, 2020). Frydman (2017) also argues that DvT practitioners should understand how cognitive factors influence their clients because they work with both the minds and bodies of their clients. Likewise, it could also be important for practitioners to understand how neural integration works because of how closely connected the minds and bodies of players are and because dysfunction within a client's neural integration could be one of the causations of their psychological distress (Johnson, 2013; Siegel, 2020). This

thesis is the first step in working toward incorporating DvT and IPNB to start conversations within both fields.

People need relationships and connections with others, therefore without flexibility, interpersonal attunement, and tolerance, clients can be left with feelings of disconnection (Frydman, 2016). By intentionally informing DvT with IPNB, practitioners may be able to help clients foster the flexibility and tolerance they need so they can regulate themselves better which may improve their relationships with others (Johnson & Pitre, 2021; Siegel, 2020). When working with clients it is important to consider all the factors that may be impacting them. With this in mind, by making connections between DvT and IPNB, practitioners may be able to understand clients in a more well-rounded way so that their clients get the best care possible (Johnson & Pitre, 2021; Siegel, 2020).

Client Benefits

Clients benefit from therapeutic approaches that assist them with practicing the domains of integration so that they may achieve neural integration which may lead to having more control over emotional reactions (Wood & Schneider, 2015). During a case study done by Wood and Schneider (2015), the subject reported understanding their emotions better after receiving treatment using drama therapy techniques with the intention of targeting neural integration. Though the authors did not specifically use DvT in their work with this client, clients may still feel similar effects after being treated with developmental transformations (Wood & Schneider, 2015). These effects may include better recognizing how negative past experiences have played a role in how clients got to be where they are today. Another effect might be that clients share how something has impacted how they see themselves and their relationships more effectively (Wood & Schneider, 2015).

The authors of this case study also found that clients may be able to identify triggers better because the different parts of their brains operate in a more cohesive way after treatment (Wood & Schneider, 2015). Once clients are able to identify these triggers, they may be able to make adjustments including learning new coping skills and processing difficult emotions. Additionally, clients may practice these new coping skills which may increase their tolerance of the unknown (Wood & Schneider, 2015).

After treatment that focuses on promoting neural integration, clients may see an improvement in emotional regulation (Siegel, 2010b; Wood & Schneider, 2015). If clients improve their emotional regulation, then they may be capable of having more intimate and meaningful relationships with others. Overall, clients may benefit from participating in DvT that actively considers neural integration because elements of DvT may successfully facilitate the domains of integration, leading to neural integration (Johnson & Pitre, 2021; Siegel, 2010b). This would help clients to regulate themselves better which may improve their relationships with others in their immediate circles as well as improve their ability to handle uncertainty (Siegel, 2010b; Wood & Schneider, 2015).

Future Directions and Limitations

There are several directions research could go from here, but first and foremost should be to clarify how DvT and neural integration are connected, if at all (Wood & Schneider, 2015). This research should collect both the subjective experiences of participants as well as significant quantifiable data to ensure an accurate understanding of DvT as it may relate to neural integration. Any additional research on this topic would be helpful to create a fuller understanding of both concepts (Wood & Schneider, 2015).

This paper is meant to create a theoretical foundation for future research to build upon. However, it is important to note that this author is a white, heterosexual, cisgender female student who has benefitted from a significant amount of privilege throughout her life which renders this thesis quite subjective. Empirical research will need to be pursued to gain a more definitive understanding of the correlation between DvT and neural integration.

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THESIS APPROVAL FORM

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