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Comparative analysis on: Metacognition and Mindfulness in twins with Attachment and children with ASD through I.C.T.

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Abstract. The following study examines the neuroscience of attachment and the role of mindfulness and metacognition. First, the importance of mindfulness is discussed, which is strongly found in people with attachment, particularly in twins. Next, mindfulness in people with autism is examined. More specifically, the purpose of the research is to draw conclusions about the emotional intelligence that individuals with ASD develop and the levels of mindfulness and metacognition that they are able to achieve. In the course of the study, reference is made to the factors that influence their emotional development such as stress and vortices, where its role seems to be different compared to typically developing individuals because individuals with autism follow a different developmental and cognitive trajectory. Then, topic is made to the essential role of AI(artificial intelligence), which seems contribute positively to the cognitive and emotional development of children with autism as various important technologies are used, such as specially constructed and functional robots, which contribute to both the treatment and diagnosis of autism. From the present study, it was found that all the above methods contribute to improve the cognitive level of individuals with autistic disorder and to raise them to the levels of metacognition pyramid and knowledge-cognition pyramid. Finally, the role of ICT and AI is particularly helpful in achieving this ascent.

Keywords. Neuroscience, autism, attachment, twins, metacognition, AI, mindfulness, I.C.T

1. Introduction

This literature review first examines the idea of attachment by reviewing research on neuroscience and the important role of mindfulness in the thinking of people with attachment tendencies. More specifically, weight is given to attachment between twins, and in particular to the view of prenatal and postnatal attachment. In the process, the analysis focuses on the consciousness of autistic individuals and the emotional intelligence possessed by individuals with ASD. Emotional intelligence, a term that encompasses a variety of skills and abilities that enable individuals to understand and manage emotional situations. their own and others', with the aim of social and personal development, is then emphasized and the rise to the level of the pyramid of consciousness. This ascent is accomplished through the use of I.C.T. in both individuals with attachment and those with ASD.

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2. Mindfulness and attachment with emphasis on the twins

Theory of Attachment and Mindfulness

In the view of Treleaven et al., (2012), the impact of early mother-infant relationship on infant development is well documented in the literature, with proponents of attachment theory having focused on the link between maternal self-regulatory capacity and attachment (e.g., coordination) with children's health and developmental benefits. As moving into parenthood often causes stress, research has also focused on the importance of internal and external maternal reinforcement (e.g., self-awareness, recognition of needs) in promoting healthy mother-infant relationships.

At the same time, a promising area in relation to enhancing internal support is mindfulness, an act that has been shown to improve emotional regulation while reducing stress and anxiety. Mindfulness, characterized as non-judgmental, present-moment awareness, has attracted considerable empirical attention over the past three decades and has recently been considered a key contributor to healthy mother-child relationships (Treleaven, et al., 2012).

Conscientiousness and attachment security

Beyond the speculations and hypotheses about the correlates of attachment security and mindfulness, some new evidence is presented below. In the Shamatha project, 70 people, from the US, underwent an assessment process and volunteered to attend one of two full-time, three-month meditation centers in Colorado City. The average age of the pre-participants was 50 years old, half of whom were assigned

The pre-participation assessment included, among many other measures, the Brennan et al. (1998) scale assessing the two key parameters of attachment insecurity, anxiety and aversion, and the Baer et al. (2006) scale consisting of the five aspects measuring awareness (Saron & Shaver, 2006).

All participants had to have previous experience of meditation practice and show a genuine interest in the training and their potential ability to cope with a 3-month retreat. Baer et al.'s (2006) mindfulness measures were obtained from a factor analysis of 112 items included in five pre-existing self-report measures of mindfulness administered to a sample of over 600 university students: the Mindfulness Awareness Scale, , the Freiburg Mindfulness Inventory, the Kentucky Inventory of Mindfulness Skills, the Cognitive and Emotional Mindfulness Scale, and the Mindfulness Questionnaire.

Five main factors emerged from the factor analysis, which the researchers named 1) Not responding to internal experiences, 2) Observing/attending to sensations/perceptions/feelings, 3) Operating with awareness/self-awareness/concentration/not being self-distracted, 4) Describing/noticing in words, and 5) Not criticizing the experiences. The investigators determined, through higher order factor analyses, that four of these factors (all but Observation/Attention) constituted a single factor of General awareness. Results were submitted to regression analyses in which each mindfulness score was regressed on attachment anxiety and avoidance. All 5 aspects of mindfulness were significantly predicted by the two attachment anxiety variables, which accounted for 10% to 38% of the variance. Attachment anxiety was strongly associated with and contributed substantially to lower scores on three of the five facets of mindfulness: not responding to inner experience, acting with awareness, and not judging experience. Avoiding attachment was also significantly related to and contributed meaningfully to all of the five aspects of mindfulness (the three aspects just mentioned plus observing, noticing, attending to perceptions, thoughts, feelings, and describing and describing in words) (Saron & Shaver, 2006) (Saron & Shaver, 2006).

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The two attachment dimensions, however, each having a powerful and distinct input, account for 42 percent of the variation in overall mindfulness ratings. Namely, more anxious subjects had lower capacity to maintain a nonreactive, non-judgmental stance towards their experiences, and the more aversive subjects had less mindfulness in overall conscientiousness, including lower ability to attend to their experiences and to describe them verbally (Saron & Shaver, 2006).

Further, reports in twin models showed that mindfulness is 32% heritable and 66% due to non-shared environmental factors, with no substantial influence of common environmental genetic influences. Genetic influences explain more than half of the modest phenotypic correlations between low mindfulness, major depressive symptoms, and vulnerability to anxiety. Further research will need to determine the particular underlying environmental determinants influencing the trait of mindfulness in the developmental phase to help inform targeted interventions for therapy and resiliency. The common genetic responsibility that underlies the co-occurrence of low mindfulness, depression, and anxiety sensitivity suggests that the biological pathways that these traits share also need to be explored (Waszczuk, Zavos, et.al., 2015).

Mindfulness-based neurodevelopmental care

Experiencing premature birth and hospitalization in the Neonatal Intensive Care Unit (NICU) results in stress and family separation with long-lasting consequences. Past research on neonatal neurodevelopmental care demonstrates better outcome levels in infants. No neonatal research has been conducted to educate parents on mindfulness-based neurodevelopmental care. This study investigates the impact of parent education and monitoring of mindfulness-based neurodevelopmental care on parental outcomes (anxiety , attachment and mental satisfaction) and infant hospitalization duration (Patteys, 2018).

In this controlled randomized pilot trial, a convenience sample of 55 parent-infant dyads was utilized. Parametric and non-parametric statistical analysis tests examined differences within and between study groups in terms of demographic characteristics and dependent variables of the study (anxiety , attachment, satisfaction and LOS). Findings: No statistically significantly different outcomes were found between the groups on parenting outcomes. However, parents in the experimental group (EG) showed a significant decrease in anxiety scores from enrollment to discharge (P = .012) and EG infants had significantly lower LOS (P = .026-.047) than controls. Implications for practice and research: While additional study is needed to validate research findings, modifications to current procedures to incorporate additional parent training in mindfulness-based neurodevelopmental care may help alleviate parental stress and reduce LOS that impact economic, physical, and psychosocial benefits for patients, families, health care systems , and society (Patteys, 2018).

At the same time, a collaborative approach to increasing the thinking skills of parents and infants is the theory of Mindful Parenting. At the same time, a collective approach to raising children with mindfulness (1998) has suggested that the core of psychological prevention in early childhood should be improving mindfulness. For this reason, his research introduces Mindful Parenting, an innovative psychotherapy group that aims to promote mindfulness in parents and their infants/children. The interdisciplinary underpinnings of this group work, including the utility of applied infant observation, are followed by an exposition of the building blocks of Mindful Parenting. Evocative moments from the group's experience are interwoven in an attempt to understand the methods by which Mindful Parenting seeks to restore, nourish

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and support the most fundamental, verbal and non-verbal, emotional relationships between parent and child.

The study concludes with clinical material on the birth of a couple who have a concept of mind. RwE was a new model created in 1978 by child development expert Magda Gerber (Gerber, 1998) and her colleague Tom Forrest, MD, based on the work of her mentor, Hungarian pediatrician Emmi Pikler, with orphaned children. of families in group meetings (Roche, 1994). Working with small groups of single parents and infants, Gerber designed an experiential form of parent training to acquire respectful parenting practices.

Attachment between twins

According to Sideraki's (2020) study, findings were conducted on attachment among twins. More specifically, her research was based on Ainsworth's study, with the difference that she examined the attachment of the twins rather than the mother and infant. The purpose of this study was to draw new conclusions on the topic of attachment between twins and to create a research tool based on twin attachment. Both parents and teachers should be aware of the existence of attachment between children, as it is a condition that directly affects the life and psyche of children both in their youth and adulthood. Still, the children's environment seems to be able to introduce new pedagogical methods and practices designed to manage such a situation , for the benefit and mental health of the twins (Sideraki, 2020).

The methodology of the present research was based on the research tool that included the "Strange Situation" experiment devised by Mairy Ainsworth in the 1970s to observe attachment relationships between a caregiver and a child. It applies to children aged 18 months and older. Attachment was characterized by the following stages : (1) secure, (2) unsecure (avoidance) (3) disorganized. Then, to create her research tool for twins , Sideraki also relied on the "Attachment Q-sort" tool which presented infant behavioral cues to the mother that predicted the existence of attachment (Everett Waters. April (1995).

Based on these two theories, a questionnaire-based tool was created that examined the behaviors and reactions of twins when they were alone in a room with a stranger, and then when one twin withdrew. From the results of the procedure, the type of attachment that exists between the twins can be determined : (1) secure, (2) non-secure (avoidance) (3) disorganized The instrument refers to children from preschool to 6 ears (Sideraki, 2020).

In conclusion, when it comes to attachment between twins, it is important that both parents and teachers are aware of the children's feelings and experiences. There should also be special treatment during the school years so that children can develop their own personalities and make a smooth transition from childhood to adulthood without being affected by the existence of attachment of one twin to the other. Therefore, it is very important to detect the signs of attachment from infancy, and the effective way of managing it (Sideraki, 2020).

Prenatal attachment in twins

There were three identified trials that investigated antenatal attachment in twin pregnancy (Zlam, 1995). In one descriptive case series of 10 studies of 10 mothers that used grounded theory methodologies, the mothers reported the relationships they developed to their unborn twins through embryonic activities, sonograms, dreaming, speech (talking to the embryos), and physical hand movements (rubbing their belly); the mothers viewed their twins differ according to the zygote. Identical twins were portrayed as a couple with similar features, while typical identical twins were depicted as people with different features, but still represented

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as a pair (Zlam, 1995). The results of this study, though, were constrained by the small size of the sample and the necessity to confirm the results using alternate methodologies.

A study second examined the prognostic determinants of both the Quality and Intensity of Prenatal Attachment at 27 gestational weeks in 61 mothers who were expecting twins (Colpin, Munter,et.al., 1998). Higher psychosocial well-being scores (i.e., lower stress and lower depression) and higher conjugal contentment were predictive of higher maternal attachment quality (R 2 = 0.18), but those covariates only explained a small percentage of the quality of maternal attachment (R 2 = 0.18), but those variables only explained a minor portion of the maternal attachment score. The multiple factor analysis of multiple regression supported no correlation between those covariates and antenatal attachment severity.

Though attachment ratings Though attachment scores were significantly higher for the twin born second (twin B), the mean difference was small (0.56 on a scale of 34 to 83), suggesting little clinical significance. Gestational age (r = 0.30, P < 0.001) and foetal movement (r = 0.28, P < 0.001) were weakly associated with prenatal attachment (Domato, 2020). The limitations of this trial involved the use of a homogeneous sample and the usage of attachment tools that were previously tested in mothers of twins .

3. Mindfulness and metacognition in autism

Mindfulness in children with ASD

Mindfulness-based treatments are increasing in their popularity. Evidence of their efficacy in decreasing emotional discomfort and improving wellbeing for those families with autism spectrum disorder (ASD) is however limited. The subsequent synthetic review found 10 separate independent trials that involved a convenience sample of 233 children and adults with ASD and 241 family caregivers. The effect sizes with 95% associated 95% confidence intervals, adjusted for heterogeneity, were estimated using a randomised impact analysis model. The caregivers, children, and adults who experienced mindfulness all reported substantial benefits in their subjective well-being soon after the interaction. The available data indicated that the intervention impacts were maintained at 3-month follow-up. Mindfulness appears to show great promise as an interventional intervention strategies in ASD populations, however more randomized controlled research is required to establish its precise effectiveness for the families and sub-groups impacted (Hartley, et.al., 2019).

In Addition, an essential complement to the molecular therapies, the psychological intervention for autism spectrum disorder (ASD) is both effective and viable. The Western-influenced notion of mindfulness is such a highly powerful psychological construction with extensive benefit spanning the fields of health, educational, and business. By alleviating the challenges that are inherent in some inflexible cognitive and behavioural norms, mindfulness-based mindfulness cognitive fluidity enhancement intervention that rely on attentional awareness training for variability have shown great promise for improving the well-being of individuals with ASD. The purpose of the current study was to review the supporting data that mindfulness accounts for the growth and developmental benefits of psychological mechanisms in children with autism in the West. In this concept paper, we first reviewed broad based evidence for the gains of a range of mindfulness influenced Western interventions for individuals with ASD, after which underlying intra-individual process and their effects emerge. Lastly, the psychological underpinnings of current core ASD cognitive theories were addressed (Poquérusse, et. al., 2020).

The findings , establish the established relevance and ongoing promise of Western-influenced mindfulness training to improve the understanding and psychological well-being and

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overall well-being of individuals with ASD and to create mindfulness-inspired interpretations of interventions designed to improve the life of people and families impacted by ASD in a noninvasive manner (Poquérusse, et. al., 2020).

Moving forward, considering the difficulties in social interaction and neurocognitive function, the requirements of the social context are often higher than the cognitive coping skills of children with ASD. Under the transactional stress model, stress occurs when people are experiencing higher demands than their coping skills and this results in physical and psychological stress responses such as frustration, frustration, depression and anxiety (Lazarus & Folkman, 1984).

This model may help explain why children with ASD, in additional to the core autism symptoms, often also suffer from emotional and behavioural issues. Children with ASD perceived to have higher levels of anxiety and poorer coping skills than children without ASD (Browning et. al, 2009). For 70% of children with ASD, additive internalizing and externalizing symptoms meet the criteria for at least one comorbid condition (Simonoff et. al, 2008). Anxiety disorder, enactomotor defiant disorder (ODD) and attention-deficit/hyperactivity disorder (ADHD) are common comorbidities. The Presence of comorbid states is associated with reduced quality of life in ADHD. Children with ADHD need treatment to enhance coping skills and reduce anxiety and co-occurring problems (Ridderinkhof, et.al., 2018).

The 8 Pillars of Metacognition

At the same time, according to the proposed multilevel model, each level of metacognition involves a specific high-order and specific-function control mechanism, which operates according to a number of attention-related procedures. The multilevel model of metacognition aims at developing certain cognitive functions related to attention. It also consists of a high-order and function-specific control mechanism and methodology. More contextually, according to the model, when the level rises, the individual is led to surprise and manifests characteristics and skills that promote high-order abstract cognitive representations. At this point, the 8 pillars that contribute to the pyramid of metacognition will be mentioned. As the level rises, more advanced features and functions are manifested that are perfectly consistent with the subjects' need to produce higher order abstract mental representations, thoughts and emotions. The eight levels of the eight pillars of metacognition are: Regulation of physiological and sensory processes. Adjustment of the physiological and physiological and sensory processes. Recognition of stimuli, different sensory features as well as changes in the visual field. Distinguishing between competing or similar stimuli. Recall of sensory information; and Retrieval of useful strategies. These levels are the same in all metacognitive processes (Drigas & Chaidi, 2021).

The main goal of the metacognition model is to create effective methods for developing metacognition theory so that it can be adopted within a teaching field. At the same time, the review of researchers reveals the fact that the process of self-regulation is particularly important as it contributes to the rise from lower to higher levels. On the other hand, self-regulation contributes to the cultivation of self-awareness over time (Drigas, 2021).

Of course, self-observation is particularly a time-consuming and multi-year process. In philosophical terms, self-observation as a kind of metacognition amounts to the process of retrieving the last moments of consciousness, which are retrieved in memory and through which subjects understand more holistically the events of the events that have taken place. To continue, it is worth mentioning that metacognition is an "open-type" activity, i.e., the individual must be able to perform metacognitive processes in his or her own way. More specifically,

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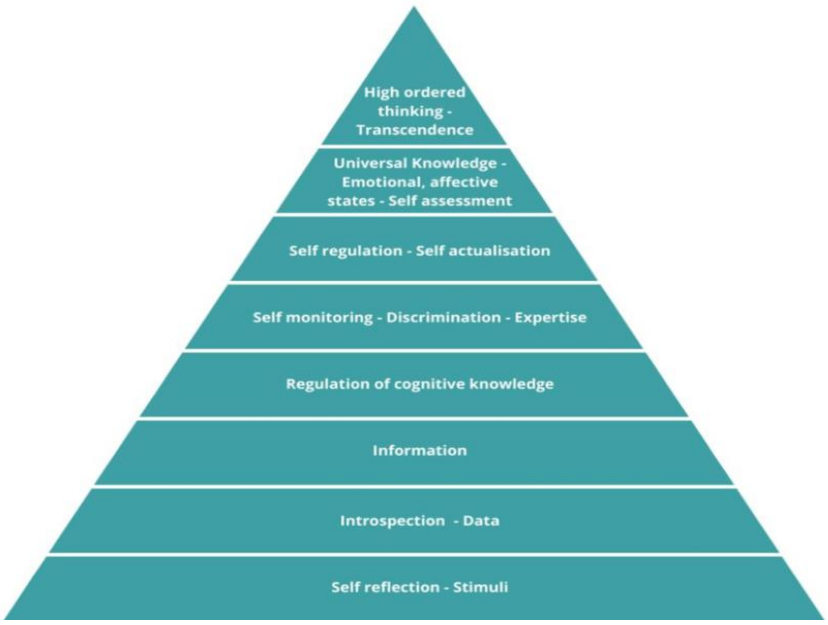
metacognitive processes expand as each self-observation deepens in the description of the personal cognitive system (Papoutsis & Drigas, 2021).



4. The contribution of I.C.T.

The incorporation of digital technologies in education domain is very productive, successful, facilitates and improves the educational procedures via Mobiles [30-39], various ICTs applications [40-82], AI & STEM [83-99], and games [100-106]. Additionally the combination of ICTs with theories and models of metacognition, mindfulness, meditation and emotional intelligence cultivation [107-133] as well as with environmental factors and nutrition [26-29], accelerates and improves more over the educational practices and results.

Usefulness of AI in Autism spectrum disorder

The vast majority of ASD studies, with functional MRI (fMRI) data extraction during task work, have been performed with either adults or adolescents and adults in combined adolescent and mixed groups. A side-by-side comparisons are made between individuals with ASD and standard control subjects. Task-related fMRI investigations have focused primarily on the activation in particular regions of nodes of the social functioning of the brain, including DMN (Default Mode Network , brain network) areas outlined below (Padmanabhan, Lynch, et.al., 2017).

Studies focused on the self-referential procedure, requiring self versus other-related crises, indicate reduced activity in the PCC (posterior cortex of the cortex cingulate cortex) and mPFC (the pre-frontal cortex, a brain region) . A trial comparing the neural responses in the ventral mPFC to the stimulation of self- versus all-relational judgments demonstrated a preferential stimulation of this area for self- versus allrelational Analysis of multivariate models in further suggests that in adults with ASD, that the PCC in particular, is not sensitive to semantic processing of words suggesting social interactions (Padmanabhan, Lynch, et.al., 2017).

Furthermore, machine learning algorithms classified individuals as autistic or neurotypical with fairly good accuracy rates (97%) using neurocognitive fMRI markers in these regions. Overall, the results suggest that the PCC and mPFC exhibit abnormal patterns of self-representation in ASD (Padmanabhan, Lynch, et.al., 2017).

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DBC researcher tool

This study was conducted by the Monash Medical Centre in Melbourne, Australia. The objective of the investigation is to investigate the development of the infant. A 638 case sample was used of which 50 per cent comprised of persons with an autistic disorder. All specialist doctors who were experienced in autism were consulted the "gold standard" in order to help guide the diagnostic . They then pooled another 100 cases (62% autistic disorder, 38% no autistic disorder) multi validation data gathered in Sydney in 3 separate early childhood clinics (Leichhardt, Tumbatin and Kogarah clinics). For both data subsets, the variables comprised 96 DBC (tool chart) data items filled out by the parent/caregiver. The IQ level was encoded as severe disabled, moderate handicapped, mild disabled. Diagnosis of autistic disorder were coded as per DSM-IV criteria. Use of technology takes up an essential part in mental health diagnosis. The aim was to compare an MLP (artificial neural network) with a Logistic Regression neural network to establish whether the MLP was a better diagnostic classifier (Hosmer & Lemeshow, 1989).

For both neural net and Logistic Regression, the first data set (N = 658) was used for extracting diagnostic taxonomists. ROC curve (statistical curve) , (Swets, 1988), were used as a comparison metric. For both methods, the region below the ROC cost curve was adjusted with a 100 x bootsstrapping process (Efron & Tibsharani, 1993). The fitted value of ROC curve provides a reasonable estimate of the way in which any diagnostic classifier would perform in the future instances.

The second data set (N = 100) was used to comparatively evaluate the comparative performance evaluation of both the classifiers (neural net and accounting recursion) on particular instances that had not been used previously to extract a classifier.

In terms of validity, DBC-NN compares favourably to other widely used instruments and methods. No other tool has used a cross-validation test, which provides the most accurate indicator of the classification ability of a diagnostic classifier (Florio, Einfeld, et.al., 2009). However, the agreement between physicians on the autistic disorder diagnosis was reported to be 85% in accordance with DSM-IV domain studies. Given that the clinical diagnosis by using the DSM-IV , criteria are the norm for diagnosing autistic disorder, 85% is the maximum validity agreement any other method can achieve. At 80%, the DBC-NN is near this notional upper bound and therefore yields a relatively good performance.

The role of Chatbots in therapy

A chatter bot or just chatbot is a human-like piece of software. With this software it can respond to text-based queries or suggestions just like a person (Mujeeb, Javed, Arshad, 2017). The development story of chatbots is unlike any other software. Whilst chatbots are available now for various computer types as well as for platforms - from PC to Android and iPhone - it is commonly seen that their primary use is in the entertainment industry. As humans progress in regards to the science and technology, you find that they find themselves in a sharp drop when it comes to psychological problems. Those psychological problems can be of minor importance but can be important in some instances.

Psychological notions, methods and theoretical concepts can be used to analyse and analyse human/technology interactions (Oulasvirta & Saariluoma, 2006), and this interplay can be used to identify the psychology of the user.

Due to the rise in psychological issues and the lack of availability of human psychologists, there is a strong need to develop a system that helps in diagnosing psychological

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disorders to save the time of the psychologists. At present, there are a great number of artificial conversation robots, such as available robots, in which the main aim of these robots is to talk and thus they are limited to providing recreation, customer support and advertisement (Nunes, Pinheiro, Pequeno, 2009). A number of chatbots are also used with the aim of teaching and better student learning (Sun,Kang, Zhang, Zhang, Fang, ,Xu, 2010). This proves to be an exciting point. That is, one can use a specially developed chatbot to engage with the users, get more insights about their psychology and thereby diagnose their psychological issues, if any.

Chatbots have been already used in the area of psychiatry (Morales-Rodríguez, González, et.al., 2010). The chatbot has been used to train and to improve the abilities of psychology and psychiatry students at the University of Barcelona to diagnose a generalized anxiety disorder (GAD).

In summary, the aim at this stage is for the researchers is for a chatbot to evolve into an Embedded Conversational Agent (ECA) with the ability to articulate emotions and create personality traits via written texts. The architectural design was based on emotions and personality attributes by seeking to create an ECA of emotional dialogues based on AIML (Artificial Intelligence Markup Language) (Mujeeb, Javed, Arshad, 2017).

The role of ICT for anxiety in autism

In particular, in addition to the cognitive impairments that are directly associated with autism, investigators are concentrating on the characteristics of these persons as well as on the features of the functionality and the use of the robots as instruments of interventions and therapy for individuals who have been diagnosed with autism (Drigas & Sideraki, 2021).Now, the computer software is equally helpful in identifying the emotions and expressions of facial features in persons with autism. Golan et al (2006) used "Mind Reading", aimed at recognizing feelings via a sorting system that tracks emotions and emotional states in people with functional autism. These programs therefore seem to assist autistic kids with autism to improve emotion identification and build up new skills in a more accurate, engaging and efficient manner (Vakola, Driagas et.al., 2019).

Lastly, the practice of using robots in the educational process has been proven to decrease cognitive and perceptual impairments in people with this impairment, while also enhancing the growth of metacognitive abilities (Mitsea, Aktivopoulou, et.al., 2020). The reason that robots are so advantageous for individuals living with autism indicates that they may actually choose to prefer to engage in interactions with robots over humans, because the robots are simpler, less predictable, and more repeatable. That' s because they foster mimicry, attentiveness, communication skills focus, and they encourage more social expression.

Conclusions

It can be seen that the issue of the neuroscience of attachment is of great concern to the scientific community at both the social and genetic levels. Referring to a condition that directly affects the psyche of the person experiencing it, it would be important to provide answers and adopt methods that will lead to a more effective management of the condition.

In particular, when considering attachment between twins, it is of great importance to know the emotions experienced by the children, especially by parents and educators. There should also be special treatment during the school years so that children develop their own personality and consciousness, with the aim of making a smooth transition from childhood to adulthood , without the adoption of attachment and dependency behaviours from one twin to the other. In this way, each twin will function autonomously having a complete personality and

personal and correct reasoning .Therefore, it is of great importance to detect the signs of attachment from infancy , and an effective method of managing it in order to develop the emotional intelligence and conscientiousness of the twins during adulthood.

From the present study, it was found that attachment is directly related to lack of conscientiousness and difficulties in the development of emotional intelligence in twins. The existence of attachment between twins is a dysfunctional condition that creates chronic and unrelenting anxiety in children from infancy and is often manifested by outbursts of anger and intense crying when the twins are not together. This condition needs to be addressed from infancy with proper interventions so that the twins develop an independent personality that will follow them into adulthood. Furthermore, twins tend not to develop friendships and relationships with their peers as they choose to function as a dyad, resulting in strong anti-social behaviour. Cultivating mindfulness and emotional intelligence in twins are two key parameters for this development and eliminating stress and promoting their socialization as two separate entities.

The literature review reveals the fact that the lack of mindfulness and development of emotional intelligence in twins with attachment is similarly lacking to the lack of mindfulness and development of emotional intelligence in children with ASD. Children with autism also exhibit strong antisocial behaviour and also quite high levels of stress, resulting in difficulties in cultivating their emotional intelligence.

The following literature findings emerged regarding the importance of emotional intelligence. In contrast to the cognitive intelligence, which is developed in the first few years of a child's life, the emotional intelligence may develop across the lifespan. Affective abilities are mainly shaped by the impact of the context on the person. Emotional intelligence development and nurturing starts during the early life stages of a person's development, it continues to be shaped during the school age and in older ages, the construction goes on on the initial affective abilities. The perceived affective intelligence of people typically grows over the course of a lifetime, ranging through early adulthood to middle age. Adolescents' affective Intelligence, on the other hand, is not significantly changed in between the ages of 12 and 16. In the following, the literature review focuses on how to develop mindfulness , metacognition and emotional intelligence in individuals with autism and twins with attachment.

This way arises from the use of ICT that contributes to the development and improvement of functionality in people with autism and in typically developing people who are not able to develop their emotional intelligence , such as twins with attachment where due to the strong relationship that has developed between them it is impossible for them to become autonomous and develop an individual multifaceted personality.

More specifically, it was found that programmed robots are a specific stimulus that contributes to the development of individuals' cognitive abilities through interaction with them. At the same time, in the development of cognitive functions, it appears that mobile apps work beneficially as they typically focus on deficits in emotional intelligence.

Mobile apps such as Android tablets still seem help develop emotional intelligence. The use of the toys is based on the image and a kid is able to build his/her personal daily routine using the toys. This way, the apps are appropriately planned according to the particularities of the kid, so that he can develop social interactivity and define the time in the order of the images.

Therefore, it follows that, individuals with autism but twins with attachment behaviors as they interact with new technologies can develop their cognitive and functional level , showing and following the upward evolution in the levels of knowledge , consciousness and emotional intelligence.

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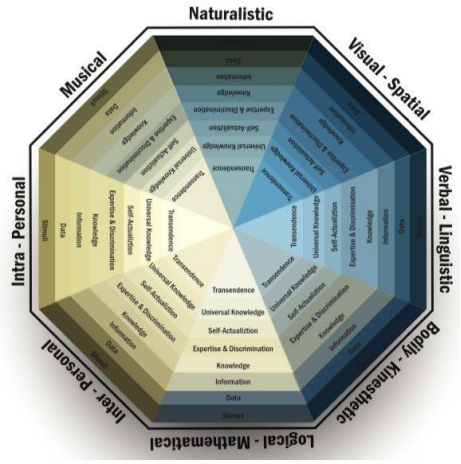
More specifically, twins who have developed attachment to each other , through this interaction with new technologies, are able to become autonomous as each child can own their own device and without sharing. Still, each twin child can spend individual time when interacting with the technological device making their own personal choices and creating their own unique experiences without receiving any influence from their sibling. Thus, he will be able through self-observation and self-recognition to be guided to discern emotions without the help of his twin.

Similarly, AI helps improve deficits of autistic children which may be related to weaknesses in socialisation, speech, eye contact, etc. and equally helps them to develop their emotional intelligence through accepting and then expressing their emotion , as well as taking initiative in managing the device and making personal choices.

Thus, the rise from lower to higher levels of metacognition is directly intertwined with the development of functioning and development of people with ASD and twins with attachment and the use of ICT is the means of this rise.

Every metacognition level still outlines a higher order control system, which works in accordance to a set of norms.The control system operates according to a set of norms (Drigas & Mitsea, 2021). The use of ICT also seems to contribute to the enhancement and rise of individuals at the levels of the pyramid of knowledge-consciousness in both categories of children we are examining (children with ASD - twins with attachment). More specifically, cognitive ability consists of important skills such as proper functioning of working memory. Based on the knowledge-consciousness pyramid and following each level, the individual can develop cognitive functions (Drigas & Mitsea, 2021).



The aim of this procedure is the optimization of adaptation to the equivalent demands and needs that occur in the course through the learning procedure (Drigas. & Pappas., 2017). As has been seen, AI and the role of ICTs is an issue that has been, and will continue to be, of concern and influence to the scientific community. Their influence is also felt in the lives of both individuals with autism and individuals with typical development, as have facilitated this considerably through different apps. Their main purpose is to enhance the life quality of such people through skills building. Furthermore, even though emotion reproduction by machines is hard to accomplish, they have developed applications that target this. Moreover, the multitude of instruments and tools and tests that are available to be used, particularly for ASD, provide a great data base and information and are a very promising resource for more extensive research

in the field in the future, as they can be modified and evolved easily according to specific demands.

Its multiple benefits in the lives of children with autism and twins with developed attachment to each other are noteworthy as both of these categories lag behind in the development of personal emotional intelligence and mindfulness, and the artificial intelligence is able to provide self-esteem, self-confidence, enhance creativity and foster critical thinking and help children develop skills in relation to mindfulness and metacognition, having an upward trajectory and developmental maturation.

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