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SPECIAL ISSUE
Digital clinical settings and virtual environments in assessment and treatment

COMMENTARIES ON SALVATORE *ET AL.*, *RIVISTA DI PSICOLOGIA CLINICA*, 1/2023

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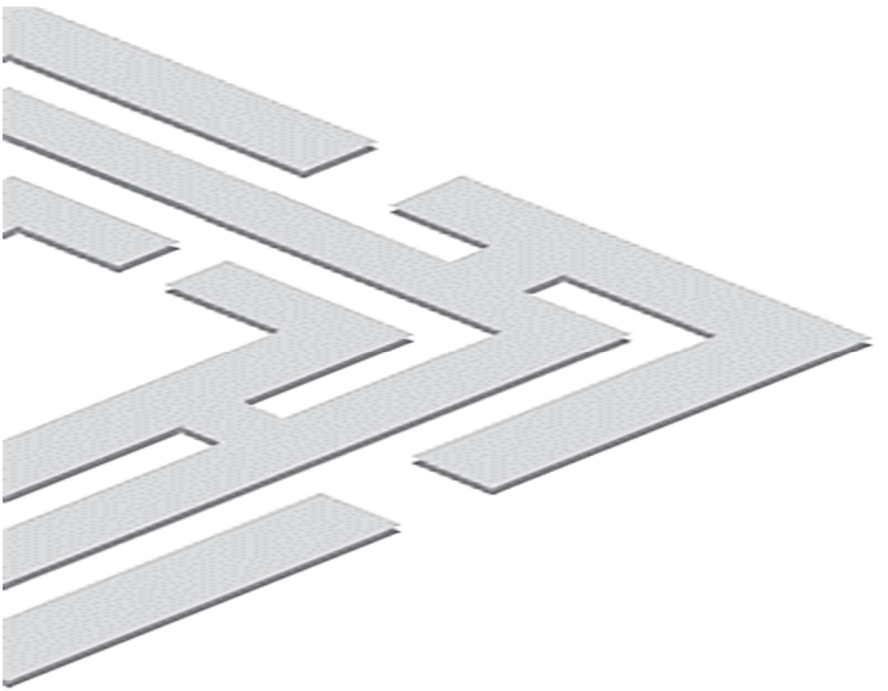

COVID-19: Remote diagnostic assessment of children with suspected Autism Spectrum Disorder, a selected literature review

Liliana Carrieri[*], *Arianna Benevenuto*[*], *Paola Venuti*[*], *Giulio Bertamini*[**], *Simona De Falco*[*]

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Abstract

Diagnostic evaluations of neurodevelopmental disorders dramatically reduced and slowed down following the disruptions caused by Sars-CoV-2 pandemic. For this, it was necessary to identify solutions allowing diagnostic assessment, screening, and early patient care by implementing remote diagnostic protocols respecting the restrictions imposed by the lockdown. Centres and services specialized in Autism Spectrum Disorder (ASD) had to quickly implement innovative diagnostic protocols able to satisfy patients' needs, minimizing the chances of spreading the virus at the same time. This work collects the studies conducted so far on remote assessment of ASD both prior to and relating to the period of the SARS-CoV-2 pandemic. It also explores standard diagnostic tools that have been adapted for remote administration, in order to evaluate strengths and limitations of these methodologies.

Remote assessment methodologies were initially employed to overcome the difficulties of long-distance diagnoses and to respond to families' need for continuity of public and private services. These studies underlined the

[*] Department of Psychology and Cognitive Science, University of Trento (Italy).
[**] Department of Child and Adolescent Psychiatry – Pitié-Salpêtrière University Hospital – Sorbonne University, Paris (France).

Corresponding Author: Liliana Carrieri, Dipartimento di Psicologia e Scienze Cognitive, Università di Trento (Italy), Corso Bettini 84, 38068 Rovereto. Email: liliana.carrieri@unitn.it

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validity of some remote diagnostic protocols and how telediagnosis may enable the diagnostic evaluation, making it more accessible and thus favouring timely intervention. We discussed the opportunity to integrate in person and remote approaches for diagnosing neurodevelopmental conditions, even in the post covid emergency period.

Keywords: Autism Spectrum Disorders, remote diagnosis, children, tele-diagnosis, remote assessment, ecological

Introduction

Since the World Health Organization (WHO) declared that the new SARS-CoV-2 virus (March 11, 2020) had led to the pandemic of COVID-19 disease (Punzo *et al.*, 2021), heavy consequences dramatically impacted three main domains: health, society, and economy. From the economic point of view, the effects were mainly related to a decline in employment, personal income, and an increase in absolute poverty. The scientific literature sharply highlighted the dramatic effects of health resources depletion for care providing, including, reduced access to the health care system, the presence of fear and stress, among other factors. The health effects were also closely linked to the dramatic consequences of the COVID-19 pandemic on various social systems (Peirone, 2020; Falcone & Detty, 2015). Specifically, several containment measures were taken in order to reduce the spread of the virus, including school closure and the drastic reduction of nonessential health and social services (e.g., deferral of non-emergency visits or interventions) (Wong *et al.*, 2020). From the perspective of children's psychological health, these restrictions contributed to an increase in issues related to psychological well-being in all the developmental age-groups, which were mainly expressed by anxiety, depression, and stress, particularly for those individuals suffering from previous vulnerabilities. At the same time, the pandemic led to a reduction in referrals of children with possible special needs from schools, due to a decrease in children's school attendance and the consequent reduction of in-depth psychological assessments and interventions. Professionals reported a situation-specific increase in prior psychological issues that evolved into overt psychopathological disorders. In turn,

this required significant interventions at the outpatient level or hospitalization (Cusinato *et al.*, 2020). In turn, this led to an increase in referrals to the emergency public service. Generally, specialized public services were not able to meet such an increased demand. Instead, the pandemic significantly reduced the number of accesses to behavioural health care in medical, community, and school settings (Wong *et al.*, 2020).

As a result of the aforementioned aspects, clinical assessments drastically reduced and/or slowed down. Health professionals were therefore required to find novel strategies to comply with the social distancing guidelines in order to not to suspend the processes of in-depth diagnosis, screening, and early intake altogether, which are critical in several areas of mental health, such as neurodevelopmental conditions (Grzadzinski *et al.*, 2021). Autism-related centres and services also had to rapidly implement innovative diagnostic procedures to meet patients' needs while minimizing the chances of spreading the virus. Therefore, SARS-COV2 led to an extensive revision of diagnostic modalities, introducing a telemedicine-oriented approach that allowed care delivery despite the significant constraints.

A diagnosis of ASD requires careful behavioural observation taking into consideration specific elements such as communicative-relational cues that can be particularly complicated to assess due to difficulties related to emotional reciprocity and non-verbal communication (American Psychiatric Association [APA], 2022). In addition, the autism spectrum is extremely heterogeneous and often presents comorbidities with intellectual disability and other neurodevelopmental disorders. Therefore, the assessment includes multiple sources of information: parent interviews, clinical direct observation in interaction with the child, developmental scale administration, and other psychological tests measuring cognitive and socio-relational aspects (Jang *et al.*, 2021). This type of diagnostics often requires several hours and specialized second-level services in the context of public health (Istituto Superiore di Sanità Guidelines, https://www.iss.it/ long-covid-linee-guida). The pandemic has therefore led to the urgent need for a dramatic and rapid change in assessment procedures, especially in early stages of the pandemics where home confinement was the most severe. Luckily, the literature started to show promising results related to diagnostic assessments of ASD leveraging telemedicine systems

(Jang *et al.*, 2021; Corona *et al.*, 2020; Smith *et al.*, 2017) which emerged as an appropriate strategy to respond to these changes, as well as to overcome specific limitations, e.g., limited accessibility due to geographic features.

Based on this research evidence, the aim of this review was to show discuss and compere different telemedicine approaches in the contest of ASD before and after COVID-19, in order to highlight strength and limits that characterize online assessments.

Telemedicine and ASD before COVID-19

In response to COVID-19, telemedicine in ASD clinical settings increased. However, the first studies on telemedicine date back to the pre-pandemic period. These tools were designed both to facilitate consulting and to decrease difficulties in making diagnoses due to geographic distances (Regina Molinini-Avejonas *et al.*, 2015). Further, the aim also included to generally increase access to diagnostic services, which are essential to identify children at risk of ASD at an early stage in order to promptly and timely initiate habilitation and rehabilitation (Grzadzinski *et al.*, 2021; Juárez *et al.*, 2018; Smith, C. *et al.*, 2017).

As early as 2016, research highlighted that telemedicine could indeed represent an opportunity to speed up the diagnostic process. For example, the study by Smith *et al.* (2017) compared the Naturalistic Observation Diagnostic Assessment (NODA), an innovative telemedicine diagnostic approach exploiting home videos recorded under clinical guidance, with an In-Person Assessment (IPA) using gold standard instruments. IPA results were not provided to families until NODA procedures were completed. The participant age ranged from 18 months to 6 years and 11 months.

The IPA phase involved the administration of diagnostic tests. Specifically, the Autism Diagnostic Interview-Revised (ADI-R; Rutter *et al.*, 2003) is a parent interview measuring: reciprocity in social interaction, communication and language, restricted, repetitive, stereotyped patterns of behaviour. The Autism Diagnostic Observation Schedule-Second Edition (ADOS-2; Lord *et al.*, 2013) is a semi-structured diagnostic test, administered by a trained clinician that assesses

the 2 clusters of symptomatology, i.e., social affect and the area of restricted repetitive patterns of behaviours and interests (APA, 2022). The Vineland Adaptive Scales second edition (VABS-2; Sparrow *et al.*, 2016) is a parent interview measuring adaptive behaviour in different life-contexts and domains. The Mullen Scales of Early Learning (MSEL; Mullen, 1995) consists of an evaluation of early intellectual development and school readiness up to 68 months of age. Finally, the Kaufman Brief Intelligence Test – second edition (KBIT-2; Kaufman, 2004) is an evaluation of verbal and non-verbal intelligence suitable to children from 69 months of age. The Naturalistic Observation Diagnostic Assessment (NODA), based on both the developmental history and the collection of video data. Results showed diagnostic concordance between the two methods. Given the high level of agreement with the IPA, this study showed that NODA has the potential to improve the efficiency of the diagnostic process for ASD while meeting the criteria for diagnostic validity. The authors reported that NODA provided useful initial information relevant for an ASD diagnosis, and significantly accelerated the onset of the rehabilitation pathway. Therefore, this evidence suggests that the information gathered through the NODA can be comparable to the one provided IPA assessment.

The NODA was also designed to be integrated with an IPA assessment in more complex general situations. For example, in some cases clinicians may have the need to observe the child's behaviour in the home setting. Further, the procedure was designed to generate a detailed report describing specific behaviours, which can be targeted and analysed from the videos.

Despite supporting the accuracy of a new telemedicine approach, these results came with some limitations. The diagnostic assessment always involved the IPA first and the NODA afterwards, and this may have influenced the parents' behaviour while recording the videos. In addition, the sample size was too small to obtain reliable and reproducible results, and the study results should be interpreted as preliminary evidence, despite promising. As highlighted by the authors, in order to determine the reliability and validity of a new diagnostic method for ASD, numerous studies including social validity, and larger representative samples are needed.

In 2018, the study by Juarez *et al.* compared tele-diagnostic accuracy with gold standard double-masked evaluations. This first tele-assessment of young children (aged 20-34 months) correctly identified 78.9 % (15 children out of 19) of children who were eventually diagnosed with ASD (true positives), indicating a fair sensitivity of the tool. Further, no children were misidentified as ASD (false positives), as the only non-ASD child in the sample was correctly undiagnosed by the remote procedure. However, in this type of diagnostic study it is also important to focus attention on false negatives (which accounted for 5%). These patients are at risk of being excluded from subsequent assessments and may receive a delayed diagnosis. The delay in accessing appropriate care in conditions requiring early intervention actually represent a critical aspect. These findings suggest that within a population characterized by delayed developmental milestones, remote assessment still allows for a reliable and potentially accurate diagnosis of ASD. The telemedicine assessment outlined in this work involved the Screening tool for Autism in Toddlers and Young Children (STAT), an interview based on the DSM-5 (APA, 2013). The psychologists also completed the clinical best estimate assessment, classifications from an expert multidisciplinary team. Furthermore, in terms of feasibility and social validity it was found that these tools were successful in breaking down geographic and time barriers to traditional access to hospital-based ASD assessment. They indeed provided timely diagnosis, access to treatment, and follow-up monitoring to a large number of children and families.

In a study by Valentine *et al.* (2021) a systematic literature review analysed major databases of scientific publications in the biomedical, psychological, and health fields during the period from 2018 through December 2019. A review of research quality was performed in accordance with the Oxford Center for Evidence-Based Medicine Levels of Evidence. The extracted data included the type of technology employed and its purpose (evaluation, treatment, and monitoring). The aim of this systematic review was to highlight how telemedicine was employed prior to the COVID-19 pandemic, with clinical samples in the field of neurodevelopment including patients with Neurodevelopmental Disorders (NDDs), their families, and health care professionals. Telemedicine services were shown to be clinically effective for the diagnosis and monitoring of NDDs. In addition, some evidence of

positive economic impact also emerged, including increased efficiency in service delivery (e.g.: increased treatment availability and reduced waiting times) (Valentine *et al.*, 2021).

Methods

Our aim was to explore research literature and experience about telediagnosis for autism and neurodevelopmental conditions, especially with respect to changes introduced by the pandemics. Therefore, we conducted a searched the PudMed database starting from the following search string:

"(TELEMEDICINE OR TELEHEALTH OR REMOTE OR INNOVATIVE) AND (ASD OR AUTISM OR NEURODEVELOPMENT) AND (EVALUATION OR DIAGNOSTIC OR DIAGNOSIS) AND (COVID-19 OR PANDEMIC)".

The query produced N=104 articles.

The first and last authors analyzed the abstracts of the results and excluded articles that did not specifically relate to the design and implementation of remote procedures to address the diagnosis of neurodevelopmental conditions. Exclusion criteria included articles related to treatment, parent/providers perspectives, and works that did not detail and evaluate telemedicine diagnostic approaches with respect to in-person clinical outcomes. Reviews were excluded but analyzed for relevant articles.

The screening resulted in selecting N=3 articles, i.e., Jang *et al.* (2021), Wagner *et al.* (2022), and Narzisi *et al.* (2020), that evaluated telemedicine approaches to autism diagnosis.

Given that remote diagnostics could be employed also independently from the pandemic emergency, we also inspected the bibliography from these articles, identifying N=4 additional articles that presented similar approaches employed for different reasons, e.g., underserved populations. Hence, we included research works from Corona *et al.* (2020, 2021), Juarez *et al.* (2018), and Smiths *et al.* (2017).

In this review, we discuss and compare the different approaches implemented to achieve and evaluate remote diagnosis for autism.

ASD: remote diagnosis during the pandemic

The COVID-19 pandemic caused unprecedented disruptions to health care, including direct impacts on service delivery related to ASD. Thus, caregiver-mediated tele-assessment presented an opportunity to provide continuity of services within social distancing guidelines.

Among the most relevant and recent studies related to the tele-assessment of ASD children are Wagner *et al.* (2020) and Narzisi *et al.* (2020). Both research groups structured an online assessment process by repurposing or introducing specific instruments designed to assess behaviours present in children with ASD.

Specifically, the study by. Wagner *et al.* (2020) described a tele-assessment model, introducing the TELE-ASD-PEDS (Corona *et al.*, 2020). Clinicians collected structured behavioural information by scaffolding a standardized child-caregiver dyadic play interaction, guided by the clinician. The methodology also involved the administration of a clinical interview to caregivers during multiple appointments. This assessment included anamnestic questions investigating the child's developmental history, adaptive and spontaneous behaviours, current home skills, and the presence of ASD-related behaviours. Clinicians subsequently combined the TELE-ASD-PEDS behavioural observations with other information from the interviews to formulate a diagnostic impression (ASD vs. no ASD). The TELE-ASD-PEDS is described in detail in the Appendix section. At the end of the assessment, online feedback was conducted with families centered on both diagnostic impressions and practical recommendations. Most clinicians (67%) reported that an average visit took between 60 and 120 minutes. The remaining 33% reported longer visits lasting between 120 and 180 minutes. Finally, the protocol included additional assessments and resources (e.g., videos and handouts on ASD and interventions) to be sent to families via multimedia channels ensuring privacy. Because of the importance of not committing false negatives in the diagnostic evaluation, this type of initiative aligned with current research developments, which increasingly highlight the importance and usefulness of initiating intervention pathways even before the onset of a clear symptomatic manifestation (Grzadzinski *et al.*, 2021). However, it is also important to consider the inherent limitations of

public assistance, which require increasing rationalization of resources. In this perspective, telematic and caregiver-driven methodologies may represent important approaches to improve diagnostic and screening procedures while maintaining adequate sustainability in terms of costs and resources. However, in some cases distractions within the home environment made it difficult to understand the child's actual level of functioning. Finally, the highest TELE-ASD-PEDS scores corresponded to the group of children who subsequently received a diagnosis of autism, suggesting that this approach may be useful for identifying children with clear symptoms, but raising the issue of false negative detection. However, further research is still needed in order to be able to perform proper tele-assessment of autism even for the most complex and heterogeneous situations, and to facilitate remote assessment for families with difficulties or inability to access or use technological tools.

The study by Narzisi *et al.* (2020) included a tele-assessment structured in two phases: Pre-Specialty Counseling (PSC) and Specialist Assessment (SA), involving a fully remote assessment.

The PSC phase began with a call to the specialists. Afterwards, 10 self-report questionnaires were sent to the families, divided between parental and child aspects. Specifically for parents, the Parenting Stress Index – 4 (PSI-4) is a self-report questionnaire used to explore parental stress levels and as a screening measure to evaluate the parenting system (Abidin, 2012). For child aspects, the Behavior Rating Inventory of Executive Function (BRIEF) is a standardized questionnaire that measures executive functioning in preschoolers, children and adolescents in home and school settings (Gioia *et al.*, 2003; Gioia *et al.*, 2015); the Child Behavior Checklist (CBCL), is a questionnaire to analyse children's behavioural emotional problems and competencies (Achenbach *et al.*, 1991); the MacArthur Communicative Development Inventory (Bates *et al.*, 2004) is a parent report instrument which capture important information about children's developing abilities in early language, including vocabulary comprehension, production, gestures, and grammar; the Childhood Autism Rating Scale™, Second Edition – Parent/Caregiver Questionnaire (CARS2-QPC) is a rating scale to identify children with autism and to determine symptom severity through quantifiable ratings based on direct observation (Schopler *et al.*, 2010); the Repetitive Behavior Scale-Revised (RBS-

R) is a self-report questionnaire used to measure the breadth of repetitive behaviour in children, adolescents, and adults with Autism Spectrum Disorder (Lam *et al.*, 2007), the Social Communication Questionnaire (SCQ) is a parent questionnaire that evaluate communication, social and relational skills of children who may be autistic (Rutter, 2003); the Sensory Profile (SP) is a structured observational grid used by parents to assesses the child's sensory processing patterns within the settings of home, school, and community-based activities. (Dunn, 1999); the Social Responsiveness Scale (SRS) is a parent-report interview for evaluating reciprocal social behaviour, communication and repetitive and stereotyped behaviours (Constantino *et al.*, 2005).

Child cognitive profile was directly investigated through the administration of the Leiter–R parent social–emotional rating scales (Roid & Miller, 1997), the parent's perception of the child's cognitive/social functioning and emotion regulation (Narzisi, 2020). Further, an online interview with a psychologist specialized in ASD diagnosis was scheduled.

In the PSC phase, during the remote meeting the psychologist explained to the parents how to develop some short, structured videos of the child in the home environment. Afterwards, a booklet summarizing all the procedures for making the videos was sent to the family.

The PSC phase is age-specific and adapted to childrens' developmental level. With respect to preschool children, the videos were 15-20 minutes length and structured as follows:

a) The child playing with a parent (setting inspired by the ADOS-BOSCC), 15 minutes. The Brief Observation of Social Communication Change (BOSCC) (Grzadzinski *et al.*, 2016) is an observational rating scale, described in detail in the Appendix section.
b) The child playing alone (setting inspired by ADOS-2 free play), 15 minutes.
c) The child playing with a sibling (if any), 15 minutes.
d) Family meal, 15 minutes.
e) Any behavior that concerns parents, 15 minutes.

The SA was spread over four days.

During the first day, parents were required to make a 3 hour commitment (preferably in the morning). During this period, the psychologist collected anamnestic information (1 h) and performed the

administration of the ADI-R (1 h) and the Vineland/VABS (1 h). Thereafter, a team meeting was scheduled (1 h) in order to update with respect to the gathered information. Each expert independently observed the 5 videos produced by the parents and coded the provided questionnaires. In the team, there was always a clinician trained and certified for the administering of the ADOS-2 for both clinical and research purposes.

a) During the second day, the family was asked to have three remote sessions lasting 25 minutes each with the three clinicians (psychologist, speech therapist, and psychomotor therapist). During the sessions, the clinicians interacted with both the child and one parent. If the child was preschool, the parent was asked to set up an environment inspired by ADOS-BOSCC. If the child was older or non-autonomous, the parent was asked to scaffold the interaction in a LEGO therapy inspired environment. If the child showed good cognitive abilities, clinicians may request to interact only with the child in order to propose some items directly from the ADOS-2 Module 3. In this case, the three sessions lasted 45 minutes each.
b) On the third day, a 3-hour group meeting involving the clinicians were scheduled in order to discuss the child's functional profile. During this meeting the videos and the questionnaires were analysed in detail. The final preliminary diagnosis (ASD or non-ASD) was based on clinical judgment supported by the diagnostic criteria of the DSM-5, and all the source of information collected during the two assessment phases.
c) During the fourth day, the team leader, together with the clinicians, ran a remote meeting with parents to provide them with feedback about their child's functional profile and the possible preliminary diagnosis. Individualized psychoeducational counselling was provided to parents during the meeting.

A total of about 13 hours were planned for the completion of the SA phase (9 h for the evaluations and 4 h for the meetings).

The authors proposed this approach as a first step for tele-assessment; however, they also highlighted that it may not be suitable for all families, especially if unfamiliar with technology. For this reason, they believe that although it is a valid tool to get the most complete and ecological overall clinical picture by observing the child in the family context, there are still irreplaceable key elements that need in-person

assessment. For this reason, some of the families assessed online during the lockdown were invited to an in-person appointment scheduled as soon as the emergency crisis was over. Among the most positive elements highlighted by this preliminary study are the high flexibility of application and the ability to observe specific behaviours that, in an artificial environment (e.g., clinical center or laboratory), may not always be clear or elicitable. Finally, it is promising that many parents found this model easy and accessible, even though they had generally good technological skills.

Discussion: Strengths, weaknesses and future directions

In the present critical review, three main studies investigating the feasibility of televaluations for ASD diagnosis were taken into consideration in order to elaborate an evaluation of the potentialities and limitations of remote settings. The first one presented the NODA method (Smith *et al.*, 2017), a naturalistic observation diagnostic assessment tool integrating data of the developmental history through anamnestic interviews with direct observation of the child in home videos uploaded by the parents. Notably, the time required for data collection was about 40 minutes for parents to upload interaction videos, and more than one hour for clinicians to tag relevant behaviours.

The second method outlined the development of the TELE-ASD-PEDS (Wagner *et al.*, 2022), which also integrates different sources of information. This remote protocol has an administration time of 2-3 hours total and requires parents to scaffold structured play interaction with their child, remotely guided by the clinician.

The last study (Narzisi, 2020) involved a two-stage structure: pre-specialist consultation and specialist assessment. Also in this case, a direct observation of the child in different contexts is performed, with structured information gathered by careful video analysis performed by expert examiners. Even in this case, additional information was provided by parent self-report instruments. This protocol has a total administration time of about 13 hours. The video collection phase had a total duration of about 75 minutes, and 3 hours were scheduled by the group to complete the pre-specialist consultation.

In general, research showed how conducting tele-diagnosis reduced assessment time and enhanced access to diagnostic services for autistic children. In addition, tele-diagnosis reduced issues related to distance by facilitating access where geographic or logistic barriers to early initial assessment was encountered. Practitioners also reported the usefulness of the ecological observation of children and families in their home environments while interacting with familiar people and materials (Corona *et al.*, 2020). Subsequent studies further showed that most parents actually found the tele-assessment comfortable (Corona *et al.*, 2021).

Furthermore, the study by Corona *et al.* (2021) found that the majority of parents reported that they felt comfortable during the telescreening, finding the vocal instructions easy to follow. They also felt that the screening lasted for the right amount of time.

Focusing on limitations, there was a minority of parents (12%) who indicated that the screening activities did not elicit the behaviours in children that they were concerned about. In turn, this may increase the risk of false negatives. Further, from a broader perspective tele-diagnosis may not be feasible for all families, especially those who struggle to use technological devices or those who do not have an internet connection, as pointed out in the study by Narzisi *et al.* (2020). Moreover, psychometric properties are not yet available. The NODA validation study provided correlations between the online procedure and the in-person assessment, whereas for the TELE-ASD-PEDS data collection for psychometric properties is still ongoing, limiting the ability to adequately assess their validity and reliability with respect to gold-standard diagnostic tools. Finally, Wagner *et al.* (2022) pointed out that little is known about the experiences of practitioners attempting home-directed tele-assessments in uncontrolled and unstructured situations within research and evaluation protocols. Therefore, future research should include these aspects in order to develop adapted evaluation protocols for at-home assessments.

As well, future research is necessary to design and validate procedures that are flexible and less structured than those of standard diagnostic assessments while remaining easy enough to be implemented by parents. It will also be important to put special emphasis on observational aspects, reproducibility, and data collection methods that can be employed online while maintaining privacy. In future studies, it is essential to carry on focusing on child-caregiver dyadic aspects,

favouring the development of a "caregiver-mediated" diagnosis under expert guidance. The clinician will therefore play a more "external" role, in which they must be able to structure and guide the interaction not only with the child but, indeed, between children and their caregivers. Emphasizing the caregivers' role also means developing new ways of interacting with them, guiding them to enact, structure, and mediate the kind of interactions that are generally employed by clinicians in assessment processes. Such procedures could, on one hand, greatly increase the complexity of tele-assessment and, on the other hand, greatly reduce the waiting time to make an early diagnosis. Moreover, clinicians will probably face more challenges during this particular type of assessment, given that they will need to take into account both the elements of the dyad at the same time, while not being able to directly intervene to mediate the exchange as it generally happens during in-person evaluations. Finally, as pointed out by Corona *et al.* (2021), it will be crucial to understand for whom and under what circumstances telemedicine is the most appropriate and effective, in relation to the precision and individualization of care.

Conclusion

The possibility of observing children and families in their home environments can increase the external validity of the diagnostic process due to the possibility to collect information with high ecological value involving different contexts of the child's life. This kind of information represents key aspects already included not only in diagnostic criteria but also for the differential diagnosis stage (DSM-5 TR; APA, 2022). As evidenced in the study by Corona *et al.* (2021), some parents indicated that the planned activities did not elicit the target behaviours they were concerned about. This result represents an important point of critical reflection for designing and developing interactive protocols and structuring specific assessment routines able to elicit key behaviours relevant for the diagnosis (e.g., dysfunctional behaviours or presence of stereotypies). This would greatly expand the external validity of diagnostic procedures. The home environment generally facilitates children with neurodevelopmental conditions. Therefore, it is arguable that, at least in some cases, the compensations provided by known contexts and

people, along with the presence of previously established routines may mask the presence of maladaptive aspects, simply because the situation is unable to sufficiently activate the child. As an example, dysfunctional profiles generally emerge only in contexts of high social and/or emotional loads, high unpredictability, with unfamiliar people, or in the face of a significant increase in the required tolerance to frustration.

The studies presented so far highlighted promising preliminary evidence supporting the clinical utility and feasibility of tele-diagnosis, while raising key concerns to design new approaches. While there are some complications related to the standardization of instruments, remote approaches make it possible to greatly reduce the waiting time, thus favouring early diagnosis and timely initiation of intervention, especially for children with autism spectrum disorders. The various studies, both before and during the pandemic, highlighted the possibility to capture some important elements for proper assessment, despite the fact that not all behaviours are observable using short videos made in familiar settings. For this reason, an integration between the two methodologies could be explored in research design that could be successfully integrated in clinical screenings and assessments.

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Appendix

Diagnostic tools for remote assessment of ASD

As of 2016, researchers have tested and validated several diagnostic tools for remote assessment of individuals with autism spectrum disorder. Among the most important and easily applicable are the following:

Brief Observation of Social Communication Change (BOSCC) (Grzadzinski *et al.*, 2016).

The BOSCC is a rating scale coded by videotaping a play session between the child and a caregiver, or with a professional. The BOSCC was developed from the ADOS-2, modifying and expanding its items to discriminate small changes over short periods of time; the items are organized into three areas, including Social Communication (SC) and Restricted Repetitive Behaviors and interests (RRB). The videotaped session lasts 15 minutes and can take place either in the child's home or in a clinical setting, but it is essential that the context remains the same in subsequent administrations. During the session, the child should be free to move around and should have a variety of materials available, all of which are accessible. Play material differ according to the child's age and level of language development. Only the middle 10 minutes of the session are used for coding, and they are further divided into two 5-minute segments. Each segment is coded separately after being viewed twice, and the final scores are obtained by averaging the scores of the two segments. Scoring of each item is done with the use of a specific decision tree.

ASD PEDS Canvas (Wagner et al., 2020; Corona et al., 2020)

The TELE-ASD-PEDS is a tool developed specifically for telemedicine with the purpose of being used by practitioners and families for the assessment of ASD. It is based on the ASD-PEDS, an assessment procedure developed through the use of machine learning techniques on a large clinical database consisting of assessments conducted through gold standards in children with ASD. This tool, designed for clinicians experienced in the early diagnosis of ASD, allows to assess the symptoms of children at risk for autism spectrum disorder less than 36 months of age, through the remote observation of play interactions within the dyad. This tool involves a structured

interaction situation using toys and materials readily available in most families' homes (e.g. bubbles). Using the TELE-ASD-PEDS, a practitioner guides a parent through several basic tasks with their child. These tasks allow the operator to check for the presence of autism symptoms. The administration takes approximately 10-20 minutes. In contrast, the entire tele-assessment procedure lasts longer. Data collection and analysis of psychometric properties are still ongoing (clinicaltrials.gov, NCT03847337). Subsequently, the clinicians analyzed the child's behaviors either using a dichotomous (yes/no) or Likert scale (from 1 = absence of ASD behaviors to 3 = ASD behaviors clearly present). The behaviors analyzed were: (1) Socially directed speech and sounds, (2) Frequent and flexible eye contact; (3) Unusual vocalizations; (4) Unusual or repetitive play; (5) Unusual or repetitive body movements; (6) Combines gestures, eye contact, and speech/vocalization; (7) Unusual sensory exploration or reaction.

The nature observation diagnostic assessment (NODA) (Smith et al., 2017)

The NODA is an innovative diagnostic approach used for tele-assessment that uses home videos under clinical guidance. At first, parents are asked to complete a short interview about their child's development and history. These responses are stored in the family's online account. The NODA app is installed on a mobile device and guides parents to record their child in four structured scenarios with a 10-minute duration: (1) family meal, (2) play time with others, (3) play time alone, and (4) parental concerns. The first three scenarios allow both social-communicative and play aspects to be observed. The application includes instructions for introducing specific social presses (e.g., interact with your child in a playful manner, call your child by name, ask your child where something is in the room, point to something to direct his or her gaze), with the goal of promoting the initiation of specific social routines or target behaviors considered diagnostically important (Smith *et al.*, 2017). The pilot study showed how these instructions improved the clinical utility of the videos (Nazneen *et al.*, 2015). The evaluators analyzed the videos, identifying each behavior using indicators taken from the DSM 5 (e.g. no social response). Based on clinical judgment, raters then determined whether there was sufficient evidence from developmental history and labeled behaviors to meet each DSM-5 criterion for ASD and, ultimately, whether to assign a diagnosis.

The use of digital setting in clinical ad learning applications

Nadia Genzano[*], *Melania Rita Difino*[*], *Pierpaolo Limone*[**], *Salvatore Iuso*[*]

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Abstract

Nowadays there is an increasing use of the digital setting in various fields, including psychology and pedagogy. Author's purpose is to explore different forms of digital setting applications, describing their possibility of usage and eventually their limitations.

First of all, the authors are going to define the concept of Artificial Intelligence (AI) and the possibility of using it in clinical settings. Then, the authors will proceed to describe the application of Artificial Intelligence and Augmented Reality both in assessment and in prevention of cognitive function decline.

The application of digital settings for treatment in the field of mental health will also be discussed, both for adult people and for young people; in addition, the ethical issues, in particular for e-therapies, will be debated.

Lastly, another way of application of digital setting is for access to education; for this reason, the authors will explain the teaching approaches that use the virtual.

Keywords: digital setting, clinical setting, psychology, artificial intelligence, pedagogy

[*] Department of Humanistic Studies, University of Foggia (Italy).
[**] Faculty of Human Science, Education and Sport, Università Telematica Pegaso.

Corresponding Author: Nadia Genzano, Dipartimento di Studi Umanistici, Università di Foggia, Via Arpi 176, 71122 Foggia (Italy). Email: nadia.genzano@unifg.it

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Artificial intelligence as a diagnostic model

Artificial intelligence technologies have the potential to develop personalized models that are plausibly more accurate than traditional clinical care, using large amounts of multimodal real-world data about patients, including the influence of risk and protective factors. Artificial intelligence (AI) learns patterns in large multimodal datasets both within and across individuals (Wiens *et al.*, 2018) to help improve understanding of current clinical status. Artificial intelligence approaches can dynamically interpret these complex data and generate incredible data and insights to potentially improve clinical methods and outcomes. One facilitation offered by artificial intelligence is that it can allow conventional methods of diagnosis and treatment to be updated, making them more effective, accurate, and appropriate. The use of AI is having increasing application due to clinical data from everyday clinical psychology that can be used to build practical AI-based diagnostic tools useful in the application of psychology. AI can contribute to proactive and objective assessment of mental health symptoms to aid diagnosis and treatment based on individual needs, including long-term monitoring and care management. AI has the potential to revolutionize geriatric mental health care and research by learning and applying such individualized predictions to guide clinical decision making. One interesting application of artificial intelligence is to accurately predict who needs mental health treatment before anyone is aware of it or before symptoms become too severe by tracking early signs of a change in an individual's daily behavior. A small but growing literature has begun to apply artificial intelligence approaches to geriatric mental health assessment and diagnosis, especially in the context of depression (Graham *et al.*, 2019) and neurocognitive impairment (Graham *et al.*, 2020). Artificial intelligence techniques, such as Neurolinguistic Programming, can identify language features sensitive to cognitive decline and can better differentiate individuals with early deterioration than traditional neuropsychological assessment (Beltrami *et al.*, 2018). To date, one area of application is for cognitive impairment and Alzheimer's disease. Fujita (2022), in fact, has developed an artificial intelligence-based diagnostic model of Alzheimer's disease based on memory clinic patients' big data from routine clinical practice, and it has high precision and recall (sensitivity)

for the diagnosis of the disease itself (Amisha *et al.*, 2019). Using eye-tracking technology (Oyama *et al.*, 2019), it was possible to create a predictive model to identify cases that convert from mild cognitive impairment to Alzheimer's disease. Indeed, this model has the potential to solve the problem of poor access to dementia experts in a population where the number of dementia patients is increasing. In addition, artificial intelligence-based support can be used as a screening tool that can suggest the most appropriate time to obtain an imaging assessment. Artificial intelligence analysis of progressive changes in dementia can predict prognosis; adding an AI-integrated tool to a conventional questionnaire can open the possibility of personalized medicine for more accurate prediction. Thus, the innovation given by AI diagnostic support can improve the quality of life in dementia and can be widely used as a communication tool between non-specialists and specialists. The literature suggests that another area of application of AI is in the specific assessment of cognitive depletion in daily activities through the use specifically of Serious Games. Serious games are games that, in addition to the fun of play, have a serious added value. They are suitable not only for imparting knowledge, but also for prevention, therapy, and use in care (Nguyen *et al.*, 2017). Although studies have shown that older adults play computer games (Jahresreport, 2020), it is noted that there are only a few studies on serious games and older adults, with an even smaller number of studies including older adults in care facilities (again, availability is limited) and even fewer studies on nursing home residents with cognitive impairment (Saint-Mauruce *et al.*, 2018). Therefore, serious games for older adults are developed with special features. Specifically, MemoreBox, a serious game designed specifically for the elderly in care facilities, was studied. The results of this study contribute greatly to knowledge in this novel area, providing insights into potential developments and implementations of serious games that can be further explored in future research. Furthermore, the results indicate that serious games (in this case MemoreBox) can have a positive impact on the cognitive abilities of the elderly and should therefore be increasingly recognized and implemented to provide engaging health promotion opportunities. The literature, moreover, highlights the high potential of serious games as an effective and motivating component in prevention and health promotion (Lau *et al.*, 2016). Lau *et al.* (2016) also showed the

combination of cognitive challenge and physical activity stimulation, which makes serious games a multifactorial and extensive means of prevention. Because nursing homes require a significant amount of social, financial and health care resources, this study focused on the implementation of serious games to potentially help address the limitations of these resources.

It has been shown how the use of serious games can be effective for different motor groups, and that training cognitive and motor skills together with serious games provides synergistic effects that cannot be achieved with separate training of physical and cognitive skills (Smeddinck *et al.*, 2014). The implementation of a user-friendly serious game as an effective (prevention) tool and its integration into standard care in nursing homes could contribute considerably to the weakness of the health care system, where there tends to be a lack of activation offerings for the elderly in partially hospitalized care facilities (Blüher *et al.*, 2016).

Interventions with virtual reality and serious games in the adult population

Milgram and Kishino in 1994 talked about the concept of a "virtuality continuum" between the real and virtual worlds that can be experienced by users according to the degree of mixture with reality (Milgram & Kishino, 1994). With the term "real environment" the authors (Milgram & Kishino, 1994) define real environments consisting only of real objects including for example viewing of a real scene in real world but also conventional video display and virtual environment consisting only of virtual objects, like a conventional computer graphic simulation. In the middle of the continuum, we find the Augmented Reality (AR) referring to any case in which an otherwise real environment is "augmented" by means of virtual (Milgram & Kishino, 1994).

Ronald Azuma (2001) said that augmented reality should mix real world and virtual elements, allow real-time interaction, and being augmented in a three-dimensional space. According to this author a main goal of augmented reality is to increase the user's perception and interaction with the real world (Azuma *et al.*, 2001).

Rudimentary forms of AR were developed long before the term

"augmented reality" was coined in 1990, but primitive forms were developed long before; AR technologies have developed mainly over the past decade with the increase in mobile devices (Barsom *et al.*, 2016). In our opinion, it might be interesting to explore attempts to use augmented reality in clinical intervention practices. For example, some authors (Han *et al.*, 2021) proposed to use the augmented reality technology in the field of prevention of cognitive function decline in the elderly realizing new type of working memory training system that enables physical activities. To achieve this goal, they made a game-based cognitive training system based on mobile augmented reality (MAR) inspired by the TMT neuropsychological test assessment tool used in psychology (Han *et al.*, 2021).

In this serious game the augmented reality technology is used to provide exploration and interaction with virtual objects, with minimal physical activity, and can be easily played with a high-penetration smartphone at any time and in all age groups (Han *et al.*, 2021).

Experts who have given opinions on the effectiveness of this cognitive training program gave positive feedback on using this system as a tool for cognitive function training of the elderly and said that the serious game may be suitable for improving spatiotemporal perception abilities (Han *et al.*, 2021).

In addition to application of augmented reality to prevention of cognitive abilities decline, technologies based on artificial intelligence has been investigated in the field of mental health. AI could support the understanding of current clinical status of the person (Alaa *et al.*, 2019) or predict a future outcome (Pratap *et al.*, 2019) by storing patterns in vast multimodal datasets both within and across individuals (Wiens & Shenoy, 2018).

For example, an encouraging application of artificial intelligence in mental health is to recognize subgroups of patients with comparable expressions of symptoms to have guidelines for the treatment (Saria & Goldenber, 2015); this could gave more time to the therapist to focus on other therapeutic goals like the relationship with the patient, where the artificial intelligence turned out not to have many applications (Luxton, 2014).

During the treatment application, with artificial intelligence clinicians could also monitor feedback from patients, like response to treatment and symptom trajectory (Renn *et al.*, 2021).

Artificial intelligence has been analysed as support in other aspects related to the elderly and dementia; as an illustration, a number of artificial intelligence devices designed to facilitate caregiving, such as support for washing or dressing or fall detection, was described by a systematic review of 30 studies (Xie *et al.*, 2020); however, most of these studies were descriptive or exploratory, so very limited evidence were offered (Xie *et al.*, 2020).

In order to support the possibility of aging at home, some researchers have used artificial intelligence to modify home environment, creating "smart homes" to promote independence and safety of elderly but also of people with disabilities (Euronews, 2020).

Renn (2021) made an interprofessional perspective of approaches based on artificial intelligence for research and clinical care in geriatric mental health, providing an overview of possible applications and challenges of using.

Artificial intelligence tools were based on technology, a field that follows a rapid innovation, and this could lead to some problems, for example that older adults could be excluded from this revolutionary digital health, as well as that developments in artificial intelligence could not be easily translate into clinical or other real applications (Renn *et al*., 2021).

In the research field, this rapidity of innovation has led to paradigm change from traditional experimental studies (Chekrour *et al.*, 2021); much of research about artificial intelligence consist in proof-of-concept and in generating hypothesis from demonstrations, that contrasts with evidence-based practice used in empirical approaches (Renn *et al.*, 2021). The authors (Renn *et al.*, 2021) noted that future work about artificial intelligence will need larger and more varied samples, including elderly adults and to incorporate multimodal data streams in order to point out clinically relevant factors and distinguishing them from temporary mood states; in addition, discussion on privacy, ethics, structural inequalities and trust should be encouraged, and environmental and social factors should be address about as well as biological and psychological factors to artificial intelligence applications in elderly (Renn *et al.*, 2021).

Serious games also have many applications in mental health afferent treatments. Serious games use play as primary method for purposes defined "serious" like educate, or motivate users to change patterns of

behaviour, in various type of context (e.g. educational or therapeutic context) (Burke *et al.*, 2009; Chatman, 2007; Fleming *et al.*, 2014). Beginning studies about serious games mainly suggest potential advantages for psychological and behavioral modifications (Tarrega *et al.*, 2015). For example, some authors (Li *et al.*, 2014; Fleming *et al.*, 2014) focused their works about serious games in depression treatment and conclude that its usage is promising, but that further research is needed, although it should be further investigated with further research.

To address the need to use serious games effectively in a clinical context and not only in an experimental setting, an international group of authors established The Collaboration on Maximising the Impact of Electronic Therapies and Serious Games (COMETS) (Fleming *et al.*, 2016). This document identified some skills that serious games must have to maximizing its benefits in mental health. One of them is the application user centred approaches, that aims to consider the preferences of user in the design of serious game to meet their mental health needs.

Another characteristic that serious games should have is to implement successful and engaging interventions. Actually, even if an intervention is effective it will haven't the same impact on the users if they aren't engaging.

The authors that have dealt with these guidelines (Fleming *et al.*, 2016) underline that future works should focus on processes behind the usefulness as well as the involvement of the users.

Regarding to interventions' development, it might be useful to stimulate collaborations cross-sectoral to easily sustain the cost and to carry out research project for implementation following the rapidly evolving of user expectations (Fleming *et al.*, 2016).

Digital intervention in children and young people

Augmented reality could have a potential in therapeutic interventions, particularly related to substance-abuse and extinction-based exposure therapies (Vinci *et al.*, 2020).

Frequently, face-to-face interventions are adapted using digital technology to addressing some barriers like costs, access to the

services and difficulties on discussing personal issues (Wangelin *et al.*, 2016); actually, digital health interventions, offered, for example, via app or internet programs, seems to be helpful in maintaining anonymity, taking feedback, giving high fidelity to the treatment and reducing costs (Lahiri *et al.*, 2013).

Especially in young people, who are accustomed in internet use, digital technologies could increase the accessibility of mental health interventions (Pennant *et al.*, 2015; Richardson *et al.*, 2010).

In considering the effectiveness of these types of interventions, it may be important to consider user engagement with digital behaviour change interventions that Yeager & Beninghr (2018) defined in term of user-perceived state of flow, a subjective feeling of enjoyment, focused attention and temporal dissociation, and in terms of the amount of usage of digital technology interventions and adherence to treatment.

Some authors (Liverpool *et al.*, 2020) wrote a review describing main tools of delivery of digital health interventions directed to children and young people with mental health issues. More specifically, these modes are apps, website, games, computer-assisted programs, the use of virtual reality, robots and mobile text messaging (Liverpool *et al.*, 2020).

The retention rate of children and young people in digital mental health interventions emerged from the review of Liverpool and colleagues (2020) is higher than that reported in another work about mental health outpatient care for young people, which presented dropout between 20% to 60% of the cases (Melville *et al.*, 2010).

The level of engagement of young people in digital interventions turns out to be influenced by intervention-specific and patient-specific factors; by previous researches about the level of engagement in digital interventions and, more in general, about the technology acceptance model (Kayeser *et al.*, 2018; Yeager & Beninghr, 2018; Rahimi *et al.*, 2018) emerge that expectations about the outcome, symptom severity and engagement self-efficacy could be considered characteristics that influence children and young people engagement in mental health digital interventions.

In the context of digital interventions for young people with mental health issues, another aspect considered is the possibility to supervise the progress of the therapy and the outcomes; Sundram, with other

authors (Sundram *et al*., 2017) developed an e-monitoring tool for electronically monitoring adolescents with depression that were following a form of web based computerized cognitive behavioural treatment.

By this work (Sundram *et al*., 2017) turned out the complexity of implementing e-monitoring tools for digital interventions, that are highlighted also by other research; for example, in the study of Marquis and colleagues (Marquist *et al.*, 2017) one of the difficulties encountered in the implementation of e-monitoring system is integrate it with pre-existing electronic medical systems.

In addition, adolescents who are in a low sociodemographic level may be disadvantaged in e-monitoring system which is based on the possession of an internet connection (Sundram *et al.*, 2017).

However, with e-monitoring system clinicians could capture finer details than with face-to-face intervention and this could, benefit them in understanding how symptoms change over time (Sundram *et al.*, 2017).

In recent years, the use of digital technologies in mental health interventions has focused not only on treatment but also on prevention. In this regard, a group of authors (Sierk *et al.*, 2022) presented a digital mental health platform for well-being on workplace; this platform makes it possible to measure and increase the well-being and mental health of employees and also allows employers to get feedback on the level of well-being of their employees.

Typically, reactive strategies are underutilized in work environments, so the use of digital technologies is particularly beneficial in these areas (Azzone *et al.*, 2009).

Regarding health promotion and prevention of psychopathology, another variable that can be considered is that of resilience in order to encourage the adoption of a resilient healthcare by clinicians. Jackson and other authors (Jackson *et al*., 2020) in their research showed a serious game called Resilience Challenge with the aim to communicate resilient healthcare principles to clinicians. This serious game has proven to be engaging and useful for users (Jackson *et al*., 2020).

In these areas (e.g.: healthcare, emergency services) in which there are significant physical and psychological consequences for people, serious games can support active learning of operators, allowing players to challenge themselves in a protected setting (Whitton, 2014).

These areas of focus are defined by Hart *et al.* (2017) "safety-critical games" because potential errors can have serious consequences.

The use of serious games in the training of healthcare professionals is expanding (Sipiyaruk *et al.*, 2018); for example, serious games have supported training in surgical procedures or to enable nurses to practice assessment (Ricciardi & Paolis, 2014).

Serious games have also been found to be more engaging than other educational methods (e.g., e-learning modules) (Dankbaar *et al.*, 2017) and also more cost-effective (Field *et al.*, 2018).

E-therapies and ethical issues

The increasing use of technology in the field of mental health highlights how the use of apps can yield great benefits for mental health management; in fact, web and smartphone apps designed to offer treatment or support for common mental health problems, such as depression, anxiety, and stress, are collectively referred to as "e-therapies" (Bennion, 2019). As more developers are seeking to produce electronic therapies for the National Health Service (NHS), it is essential that they apply clinical and academic best practices to ensure the creation of safe and effective apps. The National Institute for Health and Care Excellence (NICE) has published a set of evidence standards for digital health technologies that include apps. Evidence standards have been implemented to ensure that new technologies are clinically effective and represent added economic value for the local NHS, with the goal of making it easier for innovators and principals to understand what good levels of effectiveness of digital technologies should look like (NICE, 2019). To evaluate the effectiveness of mental health apps, a systematic review estimating the effectiveness of mental health apps at all ages (Donker *et al.*, 2013). Only 27 percent of the smartphone apps reviewed had published or pending evidence of effectiveness. Bennion *et al.* (2019) provided a snapshot of the commercial landscape of e-therapy development and the areas that need more refinement to improve their suitability for NHS mental health services, pointing out that clinician involvement, academic involvement, research or other evidence, and use of a specific psychological approach or theory need to be included in the effectiveness evaluation process.

These indicators were selected because they are based on the premise that effective digital psychotherapy interventions arise because of rigorous theoretical and empirical work by experienced clinicians and academics using a known psychological approach. The lack of a consistent evidence base makes the process of finding effective e-therapy random.

Investigation of psychological AI has produced results suggesting that text-based chatbots can reduce symptoms of depression and anxiety. Two randomized controlled trials published over two years indicated that apps delivered through a messaging service, smartphone or other web platform have efficacy. "Woebot", a text-based agent that provided cognitive behavioral therapy (CBT), reduced symptoms of depression and anxiety (Fitzpatrick *et al.*, 2017). Digital technology, therefore, increasingly plays an important role in everyday life with people regularly relying on digital products to manage aspects of their lives, however, the literature does not often address either deontology or outcomes-based normative ethics. Such evidence is risky, as mental health counselors who do not understand artificial intelligence may violate their code of ethics. Counselors who use an AI-based service without understanding it expose themselves to the risk of practicing outside their boundaries of competence. Clinical counselors use the ACA Code of Ethics (ACA Code of Ethics; ACA, 2014), which devotes a section to "Remote counseling, technology, and social media" (ACA, 2014, Section H). For many professions, it may be years before their codes of ethics are updated, but technology advances daily. Codes of ethics in the behavioral sciences should begin to specifically address artificial intelligence. Although continuous updating may be impractical, constant monitoring of artificial intelligence by decision makers, such as the ACA Ethics Committee, is recommended. Yet, the definition of AI is still unclear in many studies and there is a noticeable absence of reference to or drawing on ethical codes. There is a growing body of research devoted to the effectiveness of psychological AI. Many of them concern clinical counseling, but few discuss the ethical parameters governing studies or AI in general.

Digital setting for education

The right to education is one of humanity's inalienable rights, enshrined in numerous founding documents of democratic societies. Everyone who is willing to learn must have access to education (Park & Shea, 2020). However, the right to education faces numerous obstacles even in democratic societies. Distance learning can be identified as a means to overcome the obstacles that the right to education may face in democratic societies (Larreamendy-Joerns & Leinhardt, 2006). Furthermore, blended learning, which covers face-to-face and online forms of learning, also supports the right to education in democratic societies. Blended learning ensures education by combining methodologies whereby students obtain knowledge through traditional and online learning (Siemens *et al.*, 2015). Online learning has specific characteristics compared to traditional learning (Spring & Graham, 2017). Among the most relevant aspects, we would like to highlight how knowledge on the web is more easily shared between students and between teachers and students. In the last two decades, many studies have tried to understand learning in online communities (Shea & Bidjerano, 2011).

According to Siemens *et al.* (2015), e-learning is defined as "a form of distance education in which technology mediates the learning process and teaching is delivered entirely via the Internet". Therefore, blended learning is defined as "the practice that combines traditional face-to-face instruction with online learning" (Siemens *et al.*, 2015). Distance learning refers to a methodology for improving knowledge that has close links with distance education, which "is planned teaching and learning in which teaching takes place in a different place than learning" (Siemens *et al.*, 2015). Students struggling to attend classes have had the opportunity to learn through distance learning. Advances in technology have made new learning tools possible or expanded the functionality of already popular technological tools (Park & Shea, 2020). In the 20th century, the spread of the computer and the network led to the development of online learning spread along with the computer network (Harasim, 2000). The effectiveness of online learning can be seen in both independent and collaborative learning. In particular, online learning has supported individual learning and provided opportunities to develop experiential learning methodologies through

group activities (Holmberg, 2005). The combination of online and face-to-face learning provided more fruitful channels for students to connect with peers and instructors (Shea & Bidjerano, 2011).

Mass open online courses and analyses of learner interactions on mass open online course platforms have been studied in numerous reviews and meta-analyses on distance learning (Park & Shea, 2020). In particular, in an early period, the characteristics analyzed by reviews and meta-analyses focused on the discourse patterns of learners in asynchronous discussions in the virtual community (Park & Shea, 2020). In a second period, reviews and meta-analyses studied learners' satisfaction and levels of self-regulation (Park & Shea, 2020). More recent studies have discussed informal learning in online platforms such as social media (Park & Shea, 2020).

Chen *et al.* (2010) pointed out that over the past 10 years, the understanding of the configuration of important topics and academic publications on online learning has improved through the network of grouped topics. In according to Park & Shea (2020), it is increasingly important to consider the characteristics of online students, including their type of learning online, self-regulation and motivation in online learning research. In recent years, the Internet has played a significant role in facilitating students' ubiquitous learning, along with their cognitive enhancement in formal and informal learning environments. Without an appropriate pedagogy for learning and teaching, the effectiveness of the use of educational technology will decrease. It is also important to facilitate interactions between students and students, students and instructors, students and courses, students and instructors, students and courses content/assessment tools with timely feedback and monitoring of student learning (Siemens *et al.*, 2015).

We believe that the recent literature review on the impact of digital learning during the COVID-19 pandemic deserves further investigation. The study by Zis *et al.* (2021) examined the impact of digital learning on mental health and burnout during medical studies. Zis *et al.* (2021) conducted a baseline assessment of the impact of digital learning on mental health and burnout a few weeks before the announcement of the severe measures due to the COVID-19 pandemic. These data were re-evaluated during the study period when the COVID-29 pandemic was declared in effect. They found a high response rate of 81.4%. They found a deterioration of mental health in

the sample during isolation. Other studies show a significant increase in depression levels as the pandemic progresses (Debowska *et al.*, 2020). These data could be confusing by suggesting digital learning alone as a risk factor for students' mental health. Instead, when analyzing studies that have considered the impact of digital learning on mental health during the COVID-19 pandemic, one should consider several other factors that may have contributed to the deterioration of mental health, such as family or interpersonal stress and/or personality traits characterized by tendencies towards social isolation.

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The effectiveness of psychological interventions delivered online on the mental health of university students: New challenges for psychological sciences

Melania Severo[*], *Antonella Calvio*[*], *Virginia Guillen*[**]

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Abstract

The purpose of this study was to provide an overview of studies on the effectiveness of online psychological and psychotherapeutic interventions aimed at university students.

Studies were identified by literature search on PubMed and Scopus. Included were empirical studies in peer-reviewed English-language scientific journals; studies with samples including university students; studies that included psychological interventions or psychotherapy performed online.

Eighteen studies were selected. The predominant online intervention was cognitive-behavioral therapy (CBT). Psychological interventions delivered online were found to be effective in reducing symptoms of anxiety and depression, but also in treating other psychopathological conditions. Moreover, they showed effectiveness and acceptability at least equal to classic interventions.

[*] Department of Humanistic Studies, University of Foggia (Italy).
[**] Department of Neurosciences, School of Medicine and Nursing, University of the Basque Country, UPV/EHU (Spain).

Corresponding Author: Melania Severo, Dipartimento di Studi Umanistici, Università di Foggia, Via Arpi 176, 71122 Foggia (Italy). Email: melania.severo@unifg.it

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Interventions delivered online were found to be effective in improving the mental health of college students. They represent a useful tool to be implemented in health services provided by universities.

Keywords: digital setting, online psychological intervention, university student, mental distress

Introduction

Even before the COVID-19 pandemic, psychological interventions delivered online increased because they have advantages over face-to-face interventions. Online interventions are easily accessible, often involve only virtual instructions that allow participants to remain anonymous and are effective in terms of cost and travel (Ma *et al.*, 2021). A study by Cipolletta and Mocellin (2018) shows that online psychological interventions are effective in several areas of psychological distress, such as pathological gambling, post-traumatic stress disorder, and obsessive-compulsive disorder (Abbott *et al.*, 2008; Barak *et al.*, 2009; Finn and Barak, 2010; Perle and Nierenberg, 2013; Lenhard *et al*., 2014; Bolton and Dorstyn, 2015). The effectiveness of online psychological support has also been demonstrated in women with infertility, cancer patients and alcohol-dependent people (Baker and Ray, 2011), but also in patients who have previously completed in-person psychotherapy (Kivi *et al.*, 2014; Wagner *et al.*, 2014). Johansson and colleagues (2012) studied the effectiveness of Internet-based Psychodynamic Therapy (iPDT) in depression through a randomized controlled trial (RCT). The researchers found that most patients had improved. IPDT has also been applied to the treatment of anxiety disorders. Andersson and colleagues (2014) compared the effectiveness of iPDT, Internet-based Cognitive Behavioral Therapy (iCBT) and a control condition in the treatment of generalized anxiety disorder. The authors concluded that both interventions significantly reduced symptoms. Many studies on online therapies involve interventions based on Cognitive-Behavioral Therapy (CBT; Beck, 1967). Indeed, the first studies on CBT delivered online designed to reflect face-to-face treatments were conducted as early as the late 1990s (Barak, 1999). A large body of literature on this topic has grown over time. A 2010 meta-

analysis based on 22 RCT studies found that therapy delivered online for anxiety and depressive disorders is effective, acceptable, and practical from a clinical perspective (Andrews *et al.*, 2010). Several subsequent systematic reviews confirmed that CBT delivered online is as effective as face-to-face CBT in depression, social anxiety disorder, and panic disorder (Hedman *et al.*, 2012; Andersson *et al.*, 2014). A recent meta-analysis of 64 studies showed a large superiority of the efficacy of CBT delivered online over control groups, with maintenance of benefits at follow-up. This study also reported acceptable patient adherence and high satisfaction rates (Andrews *et al.*, 2018). Although these findings threaten to challenge the role of the face-to-face relationship in the effectiveness of interventions (Carlbring *et al.*, 2017), they also pose new challenges from which the psychological sciences cannot escape. Online interventions usually target anxiety disorders and depression (Arnberg *et al.*, 2014), but also procrastination (Rozental *et al.*, 2015), perfectionism (Shafran *et al.*, 2017) or alcohol use (Pedersen *et al.*, 2017). Likewise, studies suggest that online CBT might be adapted to many psychiatric and somatic conditions even in children and adolescents (Vigerland *et al.*, 2016). Moreover, traditional mental health services were not sufficient to meet the growing need for mental health care during the COVID-19 pandemic. As a result of social distancing, isolation and lockdown, many clinicians and mental health organizations shifted their activities to telemedicine solutions (Torous *et al.*, 2020). Wasil and colleagues (2021) demonstrated that brief online interventions could be useful in expanding access to mental health care in university students during the pandemic period. Specifically, the Author showed that young people are interested in these interventions and find them useful, with low drop-out rates. Therefore, digital interventions could provide evidence-based care to people who need support but cannot access other services. Moreover, due to their skills with technological tools, young people could be an important target group for psychological interventions delivered online.

Youth mental health has long been recognized as a global public health challenge (Patel *et al.*, 2007). Many mental disorders arise during young adulthood and have a negative impact on developmental trajectories, reduced academic success, increased substance use and unhealthy behaviour (Arnett *et al.*, 2014; Patel *et al.*, 2007). Although

young adults may represent a particularly vulnerable population to the psychological consequences of the COVID-19 pandemic, it seems that prevention and mental health of college students have not been prioritized. The pandemic situation has forced revisions in clinical practice. Short digital interventions were useful in expanding access to care during the COVID-19 crisis and may be useful in future public health emergencies. Evidence on university students' preferences before and during COVID-19 for psychological interventions delivered online versus face-to-face is mixed. Recent meta-analyses suggested that students prefer online self-help interventions to face-to-face interventions for depression (Ma *et al.*, 2021). Moreover, these self-help interventions may have comparable effects and equal adherence to face-to-face interventions (Carlbring *et al.*, 2017). However, other authors report higher dropout rates in online self-help interventions (Andrews *et al.*, 2018) and a preference for face-to-face interventions among students (Benjet *et al.*, 2020). As to the effectiveness of online interventions, based on a meta-analysis on 3.074 university students, Ma *et al.* (2021) indicated significant reductions in depressive symptoms compared. Literature suggests that college students are open to creative ways of receiving emotional help, such as games and searching for emotional help online (Lungu & Sun, 2016). As a matter of fact, in a 2016 study of college student preferences, most participants expressed a preference for online professional help over in-person help. One-third of them were inclined to disclose the same amount of information both online and in person, and most were interested in serious games for emotional distress (Lungu & Sun, 2016). On the other hand, drop-out rates in studies on digital interventions seem to be high (Fleming *et al.*, 2018). Users rarely spend more than a few minutes on digital mental health interventions (Baumel *et al.*, 2019) and most available mental health apps generally fail to retain users (Wasil *et al.*, 2020). On the contrary, university students seem to be interested in these interventions, complete them in high percentages and find them useful (Wasil *et al.*, 2021). One of the main advantages of these interventions seem to be their flexibility, continuous updating, and ability to be adapted to the needs of users (Wasil *et al.*, 2021). This perspective summarizes the effectiveness of the most significant psychological interventions delivered online in the university student population. Specifically, this perspective aimed to examine the effectiveness of a

range of psychological interventions that attempt to improve the mental health of college students. Although not an exhaustive review of literature on the topic, the purposes of this study were to identify the presence of specific interventions able to show superior effectiveness to others, the type of interventions most frequently delivered, the degree of student acceptance, the existence of a target group of students who benefit more (e.g., males versus females) and, the feasibility of integrating psychological interventions into the health care provided to students in the college setting. Finally, in this paper an overview of current, progress, gaps to be filled and future directions on this topic are argued offers an overview of current progress, gaps to be filled, and future directions on this topic.

Search strategy

In this paper, we attempted to provide an overview of studies on the effectiveness of online psychological and psychotherapeutic interventions aimed at university students. We planned two steps in the literature search. Not aiming to conduct a systematic literature review, we have selected the most recent articles on the topic, referring to the literature that emerged using the PubMed and Scopus search, which incorporates references to the biomedical, psychological, and social science literature. The following sets of keywords were used: (university student* OR college student*) AND (emotion training OR psychological intervention* OR psychotherapeutic intervention* OR psychotherap* OR psychological rehabilitation OR emotion focused therapy OR emotion* regulation intervention*) AND (online OR e-therapy OR digital setting). Based on a qualitative assessment, the studies considered most representative were selected, such as randomized clinical trials, but also cross-sectional observational studies. In the second phase, the snowballing search method was used to track down other articles using the reference list at the end of the most interesting articles from the first phase. Given that we were interested in analyzing the effectiveness of psychological and psychotherapy delivered online in university students, the following inclusion criteria were adopted: a) empirical studies in peer-reviewed English-language scientific journals; b) studies with samples including university students (>18 years

old); c) studies that included psychological or psychotherapy interventions conducted online. Also included were: d) clinical trials, randomized controlled trials, observational and qualitative studies; e) studies that used validated questionnaires, interviews or observational procedures to measure psychological outcomes. Exclusion criteria included: a) studies on developmental age population (< 18 years); b) interventions performed only in presence; c) studies that assessed only effects on academic performance; d) studies that were not published in English; e) articles whose full text could not be accessed; g) gray literature (e.g., dissertations, abstracts of conference proceedings). Based on these criteria, we selected 18 studies.

Results

The effectiveness of psychological interventions delivered online on the health of university students

Of our 18 selected studies, 9 were based on the CBT approach, two used a positive psychology intervention, one used a brief psychodynamic oriented intervention, four reported data on the effectiveness of college counseling services, and two used an intervention based on personalized normative feedback (one of them also involved gamification). The countries in which these studies were conducted are quite heterogeneous and have the following backgrounds: 1 study from Ireland, 1 study from Finland, 1 study from the UK, 1 study from Florida, 1 study from China, 1 study from the Czech Republic, 1 study from Malaysia, 2 studies from Italy, 4 studies from Australia and 5 studies from the U.S.A.

CBT-oriented interventions

Since the pre-pandemic era, there was a great deal of research on the effectiveness of online psychological interventions targeted at university students. Most of the studies either used a cognitive-behavioral approach or were based on it. In most cases, after the intervention mental health outcome scores improved significantly compared to pre-

intervention scores. Four studies evaluated the effectiveness of online interventions based on the CBT approach. Richards and colleagues (2013) compared the effectiveness of eight weekly sessions of an online self-administered CBT with a therapist-assisted CBT treatment via email. In this study, both interventions reported efficacy and positive effects on depressive symptoms both at the end of treatment and at follow-up. The authors reported that perceptions of working alliance were similar in each group, but the link was significantly stronger for the therapist-assisted email CBT treatment condition, showing positive correlations between working alliance and improvement in depressive symptoms. The study found not significant differences between the two online treatments. Similarly, clinical improvement and recovery were demonstrated by both groups equally, suggesting that various types of online interventions could fill gaps in care provided by university services (Richards *et al.*, 2013). In a single-blind RCT conducted by Freeman *et al.* (2017), 3,755 undergraduate students with insomnia followed an iCBT for insomnia (n=1891) or usual care (n=1864). In this study, the iCBT intervention reduced insomnia, paranoia, and hallucination. Cognitive orientation interventions have also been effective in reducing symptoms of post-traumatic stress disorder and distress (PTDS) in victims of rape and other trauma. Littleton and colleagues (2012) enrolled five female students in an online CBT program focused on thoughts of self-blame, difficulties with trust and intimacy, and concerns about personal safety. After completing the "From Survivor to Thriver" program, four participants reported clinically significant reductions in symptoms and no longer met PTSD criteria, with reductions in trauma-related negative cognitions. A study by Zhou *et al.* (2020) used Imagery Rescripting (IR) during an iCBT intervention targeting young female students at risk of developing eating disorders. The authors included four conditions: body or general imagery rescripting, psychoeducation and control. The two IR conditions and psychoeducation reduced global eating psychopathology and improved body acceptance, but only IR had an impact on self-compassion and dysfunctional attitudes, secondary variables that maintain the eating disorder. Other five CBT studies evaluated the effectiveness of mindfulness-based interventions. In 2016, Räsänen *et al.* conducted a seven-week Acceptance and Commitment Therapy (ACT) online intervention. The intervention included two face-to-face meetings and a

five-week online program targeted at problems of stress, anxiety, and depression. The programmes included modules based on learning skills and strategies on ACT processes: (1) clarifying values, (2) taking action, (3) being present, (4) observing one's thoughts and (5) awareness and acceptance. Participants in the online ACT-based intervention achieved significantly higher results in terms of well-being, life satisfaction and mindfulness skills than the control group. In addition, the online intervention participants' self-reported stress and depression symptoms were significantly reduced and maintained over a 12-month follow-up period. In line with these findings, a pilot study confirmed that a mindfulness programme combining a face-to-face approach with the use of text, audio and video components and intensive reminders via social network is a feasible and effective tool for mental health support of university students (Světlák *et al.*, 2021). In this study, students reported a reduction in perceived stress, as well as a decrease in the frequency and intensity of negative affect, an increase in self-awareness and a higher rate of self-compassion. Whereas less effectiveness was found in improving the use of cognitive reappraisal. Another online programme that delivered psychotherapeutic modules based on CBT and mindfulness found significant reductions in social anxiety and improvements in academic self-efficacy, although it was not effective in reducing symptoms of depression, anxiety or psychological distress compared to the control group (Farrer *et al.*, 2019). In any case, most of the participants in the intervention group maintained the results at follow-up, declaring themselves satisfied with the applied programme. Still, an online programme designed to reduce the negative consequences of perfectionism based on mindfulness techniques, compassion for self and others, discomfort tolerance and acquisition of social skills ("Intentional Imperfection Program" by Visvalingam *et al.*, 2022) showed significant reductions in self-directed perfectionism, socially prescribed perfectionism, hostility, sensitivity to rejection, depression and anxiety and a small increase in perceived social support among students. The intervention was also perceived by participants as feasible, enjoyable and useful. Finally, a quasi-experimental study showed that a one-session online mindfulness intervention was effective in reducing anxiety and improving psychological flexibility, although it reported no differences in depression, stress or fear of COVID-19 (Pang *et al.*, 2023).

Other psychological intervention

Two studies evaluated the effectiveness of interventions delivered online on alcohol use in college students. Specifically, in a randomized Controlled Clinical Trial (RCT) Boyle *et al.* (2017) compared a new type of intervention based on personalized, gamified normative feedback, which includes a point-based reward system, with the standard personalized online normative feedback widely used on college campuses to reduce alcohol use. The authors found that gamified interventions, due to typical motivational features of a game, were more effective in providing prevention information and promoting behavior change. In this study, 237 students were randomly assigned to standard treatment based on personalized normative feedback or to personalized treatment with normative feedback provided within a Facebook-linked social game called Campus Gamified Alcohol Norm Discovery and Readjustment. The results of this study suggest that gamification may be a method to substantially improve the effectiveness of the intervention in reducing alcohol use. Another randomized controlled trial was designed to prevent the increase in problematic drinking abroad by college students by acting on misperceptions about drinking norms and promoting positive and healthy adaptation in the host culture (Pedersen *et al.*, 2017). A sample of 343 college students abroad were randomly assigned to a personalized normative feedback, a living abroad adaptation feedback intervention, a combined intervention, or a control condition. The results of this study suggest that the personalized normative feedback intervention may be helpful for lighter pre-departure drinkers and that the addition of the living abroad adaptation feedback intervention may help prevent dysfunctional behavior abroad for those who report more difficulties pre-departure.

Two studies used positive psychological intervention. Auyeung and Mo (2018) conducted an RCT to evaluate the effectiveness of a six-day online self-help positive psychological intervention aimed at improving well-being and reducing depressive symptoms in 100 Chinese university students. The intervention involved writing about the best possible self. The authors report that positive psychological intervention improved well-being and reduced depressive symptoms independently of each other. The intervention's effect on well-being was mediated by positive affect and satisfaction with autonomy, while the

effect on depressive symptoms was mediated by increased autonomy. DuPont *et al.* (2023) recruited 250 university students to determine whether a two-week online positive psychology intervention delivered during the COVID-19 pandemic was able to increase positive affect, improve psychological well-being, optimism, life satisfaction, perceived social support and loneliness, and reduce negative affect in college students. As part of the intervention, they were able to choose from six different positive psychology activities, including: (1) signing strengths, (2) three good things, (3) acts of kindness, (4) the best future self, (5) writing and delivering a letter of gratitude, and (6) savoring with a mindful photograph. The findings suggest that the online positive psychology intervention was not effective in influencing positive affect, psychological well-being, perceived social support, and loneliness or negative affect compared with the control condition. During the period of the COVID-19 pandemic, one study evaluated the effectiveness of a psychodynamically oriented short online intervention aimed at promoting a process of self-reflection, self-discovery and creation. In particular, the intervention focused on overcoming an ongoing crisis among italian students and on their academic project. All students were offered four weekly sessions and then a follow-up session after three months. The results of the study showed a significant improvement in general functioning and a decrease in symptoms of depression, anxiety, burnout and hopelessness (Cerutti *et al.*, 2022).

Four studies have reported data on the effectiveness of college counseling services delivered online. Dear and colleagues (2019) conducted a study of the effectiveness of a five-session routine counseling service primarily directed at treating symptoms of anxiety and depression. The authors observed large clinical reductions in anxiety and depression symptoms and high levels of reported acceptability in a sample of 1081 students. Benton and colleagues (2016) in a large university counseling center conducted a study of the effectiveness of a seven-week individual psychotherapy using a blended online and in-person method, reducing direct contact with the psychotherapist but not eliminating it. The treatment combined online educational materials with brief contact with the therapist via phone, chat or videoconference, using mainly text message reminders, homework on mobile devices, online sessions and weekly progress assessments. Results of the findings showed a greater reduction in anxiety and greater

improvement in overall mental health, life functioning and sense of well-being in clients who received the experimental treatment than in clients treated with usual care.

Celia and colleagues (2022) evaluated the effectiveness of an online individual counseling intervention carried out during the COVID-19 pandemic aimed at improving levels of subjective well-being, global distress, emotional health, and future time perspective in a sample of 32 Italian university students. The counseling intervention used empathic listening, feedback to guide toward change and reformulation of verbal and nonverbal communication in order to generate new meanings. Results showed an increase in positive emotions, subjective well-being, and improved future time perspective after the intervention. At the same time, there was a reduction in negative emotions, global mental distress, state-trait anxiety, and perceived stress over time. Finally, one study compared online synchronous video counseling with in-person counseling using Solution-Focused Brief Therapy (SFBT) in 49 college students with mild to moderate anxiety (Novella *et al.*, 2022), suggesting that the online delivery system does not show less success than the classic in-person one.

Discussion

In this paper, we sought to provide an overview of recent empirical studies on the effectiveness of online psychological and psychotherapeutic interventions aimed at college students. The purpose of the study is to identify the most effective and most frequently delivered type of online psychological intervention currently provided to college students. Moreover, we intend to understand what gaps need to be filled and future directions on this topic. Eighteen studies were included in our work, and the most frequently found online intervention was cognitive behavioral therapy (CBT). Online psychological interventions reported acceptable, if not equal, efficacy data to face-to-face interventions. The most frequently treated disorders were anxiety and depression, but, as discussed below, online interventions have also found use in treating other conditions such as PTSD developed following sexual assault, eating disorders, or alcohol dependence. The concept of online psychological intervention refers to the interaction

between psychologist and user mediated by the use of web-based communication technologies. Individuals now live most of their daily lives connected in virtual networks: interacting with subjects and knowledge through multiple devices, breaking down barriers of time and space. The provision of psychological services at a distance is a hotly debated topic today, and one on which scientific research is still conducting studies to better understand critical issues and opportunities inherent in it. Telepsychology has revolutionized psychological services both for those who have logistical or motor problems accessing psychological services, but also for all those who prefer a more flexible way of accessing psychological services (Gamble, Boyle, & Morris, 2015). The world has changed, and the boundaries of psychological practice have expanded. In our analysis eighteen studies were selected. We found that the predominant type of online intervention was CBT (Richards *et al.*, 2013; Littleton *et al.*, 2012; Farrer *et al.*, 2019; Freeman *et al.*, 2017; Pang *et al.*, 2023; Räsänen *et al.*, 2016; Světlák *et al.*, 2021; Visvalingam *et al.*, 2022; Zhou *et al.*, 2020). This prevalence appears to be due to the ease of applying the protocol and measuring outcomes through specific standardized instruments. In most cases, psychological interventions delivered online have proven effective in reducing symptoms of anxiety, depression, eating disorders, or alcohol dependence (e.g.: Boyle *et al.*, 2017; Celia *et al.*, 2022; Cerutti *et al.*, 2022; Dear *et al.*, 2019; Novella *et al.*, 2020; Zhou *et al.*, 2020) in the college population. Interestingly, such interventions are also found to be effective in treating psychopathological conditions such as PTSD developed following sexual assault (Littleton *et al.*, 2012), a condition that involves an extreme state of physical alarm related to memories of the traumatic event. In such circumstances, an intervention delivered online can provide assistance to even the most reluctant and frightened people because of a devastating interpersonal event. Likewise, despite mixed results, these interventions have demonstrated high acceptability and adherence rates in university students. Indeed, a critical review of the literature by Richards and Viganó (2013), showed that online counseling can have a similar impact and is as likely to replicate facilitative conditions as face-to-face encounters. One target audience identified as being diffusely affected by the adoption of online therapeutic practices are young people. Millennials are digital natives and naturally expect to find and use all

kinds of services online. The positive results of chat counseling in young people were also demonstrated in 2015 by Dowling and Rickwood. In fact, multiple sessions and advancing the steps of the counseling process led to an alleviation of psychological distress within six weeks (Dowling & Rickwood, 2015). Two important components of access to counseling or psychological intervention should be considered. The psychologist, psychotherapist or psychoanalyst is called upon to adapt the profession to what are the possibilities and constraints offered by technology, always keeping in mind the deontological principles of the profession and the core characteristics, so as to accompany the evolution of their role in step with that of society. The social distance and the security measures have affected the relationship among people and their perception of empathy toward others. From this perspective, telepsychology and technological devices assumed important roles to decrease the negative effects of the pandemic. These tools present benefits that could improve psychological treatment of patients online, such as the possibility to meet from home or from the workplace, saving money and time and maintaining the relationship between therapists and patients. Telepsychology, for instance, is a valid tool, effective in taking charge of the psychological suffering caused by the pandemic and in preventing the chronicity of the disease. The prolonged stress could involve anxiety, depression, and the inability to manage traumatic and negative emotions. Furthermore, the constant fear of contagion affects daily life and leads to social isolation, modifying human relations. As a consequence of the emerging issues, psychotherapists provide psychological support online, addressing the technological challenge (Greenberg *et al.*, 2020; Liu *et al.*, 2020). In line with technological progress, professional organizations promoted specific guidelines and policies related to customer protection, privacy, screening, evaluation, and development of self-help products (Duan & Zhu, 2020; Zhou *et al.*, 2020). Technological development in mental health foreshadows future trends that include "smart" mobile devices, cloud computing, virtual worlds, virtual reality and electronic games in addition to the traditional psychotherapy tools. In this perspective, it is important to help future generations of psychologists and patients to collaborate in the potential growth areas, through education and training on the benefits and effectiveness of telepsychology. Tele-counseling is a diffuse online method used by

counselors and psychologists during the recent pandemic (De Luca & Calabrò, 2020). On this line, a significant example is the Virginia Commonwealth University (VCU) which proposed PhDs programme in telepsychology, with the aim of training future psychologists in managing the psychological effects of the pandemic through an online psychology service (Baylor *et al.*, 2019). In addition, Pietrabissa *et al.* (2015) identified some of the main benefits of telepsychology, such as reduced waiting time for consultation, time and expense savings, less travel and office rental costs for both the service provider and the user (Arnberg *et al.*, 2014; You *et al.*, 2022). As reported by the authors, online psychological services facilitate access to people who struggle to find support close to their social environment, avoiding difficulties related to mobility.

Our findings are relevant in several areas. Among the practical implications, the possibility of treating psychological distress through readily available technological tools emerges, especially for the population of college students, who are familiar with the use of digital devices and may feel more motivated to use them to improve their mental health. In addition, with telepsychology, the waiting time to get psychological counseling reduced and intervention in the treatment of psychological distress would take place more promptly than in the past. Therefore, individuals would be able to connect from home or their place of study or work, with both economic and time advantages. Among the psychological implications that emerged from our study, it is evident how online psychology can provide effective responses to various issues, pertaining to different areas of psychological distress, as also demonstrated by an Italian study (Cipolletta & Mocellin, 2018).

We conclude that online interventions may be an alternative and less expensive treatment to be implemented in university services or primary health care centers for students with depressive symptoms or at risk, especially when sufficient mental health professionals are not available. In addition, online services could be useful for students who fear a negative perception of psychological treatment and are more reluctant to access it. However, the wide heterogeneity of the analyzed interventions and collection measures limits the possibility of drawing unambiguous and generalizable conclusions. In addition, the identified interventions differ in terms of the number of sessions, total duration and outcomes considered. Further research is needed to determine

the intervention characteristics that are most relevant to therapeutic processes (Oliveira *et al.*, 2023). Based on this heterogeneity among the studies available in the literature, further RCT studies involving specifically trained professionals and interventions with a well-detailed and repeatable methodology are needed. Finally, studies are needed to establish the appropriate training and modalities to deliver online interventions aimed at such a specific target audience, as well as it is essential to establish effectiveness monitoring criteria to assess their long-term effects.

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Virtual Reality: Characteristics and application in anxiety disorders and other clinical settings

Nicoletta Trotta[*,**], *Adriana Leccese*[***], *Pietro Fiore*[****,**], *Katharina Meyerbröker*[*****]

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Abstract

Virtual Reality (VR) technology places users in a computer-generated three-dimensional environment, where they experience a variety of visual and auditory cues related to their clinical needs. Despite the considerable growth of scientific knowledge in this field, its application to clinical practice has been slow. The aim of this article is to synthesise the evidence on the application of virtual reality exposure therapy (VRET) interventions in the treatment of various disorders: eating disorders, psychotic disorders, and addictions, focusing on anxiety disorders, in adults and in developmental age. VR technologies make it possible to create and replicate dangerous and impossible situations in the real world, enabling the precise acquisition of data, facilitating a more careful evaluation of rehabilitation progress. furthermore, by exploiting the characteristics of immersiveness and presence, it is possible to virtually recreate the perfect clinical setting for each intervention.

Keywords: virtual reality, anxiety, therapy, clinical, adolescents, exposure

[*] Department of Mental and Physical Health and Preventive Medicine, University of Campania "L. Vanvitelli", Naples (Italy).
[**] Department of Medical and Surgical Sciences, University of Foggia, Foggia (Italy).
[***] Department of Humanistic Studies, University of Foggia, Foggia (Italy).
[****] Institute Clinic Scientific *Maugeri* IRCCS, Bari (Italy).
[*****] Department of Clinical Psychology, Utrecht University, Utrecht (Netherlands).

Correspondent Autor: Adriana Leccese, Dipartimento di Studi Umanistici, Università di Foggia, Via Arpi 176, 71122 Foggia (Italy). Email: adriana.leccese@unifg.it

Introduction

Virtual reality (VR) is a computer-generated simulation of the three-dimensional environment with which one can interact in a realistic way. It is an immersive technology that projects the user to any location using a special device, allowing the replication of situations that are difficult to experience (Schultheis & Rizzo, 2001).

It is composed of experiential and technological factors that can determine a radical change in the subject's self-experience. This experience is possible through advanced human-machine interaction, which exploits sensory input devices. In this way, the user interacts with the digital environment, which can be a digital simulation of reality or depart from it completely.

The word "virtual" denotes something that "is in power and not in act". It may seem similar to the concept of "imaginary" or "mental", with the difference that virtual worlds can be shared between multiple individuals (Bombari *et al.*, 2015; De Jong *et al.*, 2013). Indeed, multiple people can meet in a virtual room and experience through the senses, but not as much can be done in an imaginary room.

At the beginning, VR was predominantly dominated by the sense of sight through wearable viewers. Today, through new and interesting technologies, VR allows its users to provide increasingly multimodal feedback including touch (gloves and body armour), hearing, and proprioception through tracking body movement and posture. All these technologies make it possible to enhance the process of embodiment (embodiment) of the user in the virtual body (avatar) and immerse or transfer them within the virtual environment so they can interact with it (Grabarczyk & Pokropski, 2016).

The aim of this study is to provide the reader with a general overview of the main features and possibilities of virtual reality exposure therapy (VRET)'s use in psychology. The authors performed a literature search on three main databases: PubMed, Web of Science and Scopus.

The concept of immersivity

One of the main characteristics of virtual experience is related to the concept of immersivity, which can be described as a deep state of physical involvement in the medium, such as in a book, a movie, or a virtual environment (Bombari *et al.*, 2015; de Jong *et al.*, 2013). In virtual space, this sense of immersion is influenced by factors such as the use of a digital alter ego of the physical self, an avatar, and aspects related to the type of technology used (Slater & Steed, 2000). The main purpose of using an avatar is to be an extension of the subject's personality. In fact, the more customizable it is, the greater the user's involvement in the experience. The ability to interact with environments and objects also fosters a sense of presence and action (Waltemate *et al.*, 2018). There are also aspects related to technology that enable greater user involvement by promoting the experience, for example, the extension of the field of view, the possibility of using different sensory systems (haptic, visual, auditory), the realism of the image and virtual environment, or even the tracking of the user's movement. Augmenting the experience of a sensorimotor contingency allows the simulated sensory data to match the subject's proprioception (Sanchez-Vives & Slater, 2005).

The concept of presence

The higher the user involvement, the greater the sense of presence. The user feels that they exist in the virtual environment, as if they have the sensation of being embodied in the avatar (embodiment) (Grabarczyk & Pokropski, 2016; Sanchez-Vives & Slater, 2005; Slater & Sanchez-Vives, 2014; Waltemate *et al.*, 2018). The sensation of embodiment is enabled by the spatial coincidence and multisensory correlation between the virtual and real bodies, creating an overlap between the two (Slater, 2009). Subjects who experience an environment in VR feel that they occupy a precise body space (self-location), that they can cause or generate effects with that body (self-agency), and that that precise body is the seat of the sensations felt (body ownership), all of which led to perceiving the lived experience as real and plausible. What the virtual experience allows is a sense of self-

identification by subjects in the virtual body that can temporarily lead to a change in behaviour and self-image. Neurobiologically, through studies of "mirror neurons", it has been shown that similar brain regions are activated both when we observe a body state and when we experience it ourselves, again creating an overlap between us and that body state. The same effect occurs with the virtual avatar (Keysers & Gazzola, 2009).

The concept of self-agency

The last element that characterizes the virtual experience is related to the concept of self-agency or sense of agency. Our bodies are endowed with perceptual and motor functions that allow us to contact our surroundings. We can control our actions and predict their consequences in a continuous interaction between individual and environment (Gallagher, 2000). This reciprocity is also possible in virtual environments, where new technologies allow tactile feedback. Technologies make the movement and perception of the subject in space increasingly realistic and current. Some studies have shown how this effect is greater when the avatar is controlled synchronously and has elements of resemblance to one's physical body, going to increase the sense of immersion and presence experienced (Kokkinara *et al.*, 2015; Ma & Hommel, 2015; Nahab *et al.*, 2011; Tieri *et al.*, 2015).

Virtual reality in the treatment of anxiety disorders

The advent of virtual reality, based on the reconstruction of immersive virtual scenarios, is receiving great attention as a branch of research. Responding and meeting the demand for interventions in the mental health field is the health care challenge of recent decades (Kessler *et al.,* 2001), and modern technologies represent the tipping point for bridging some practical limitations and meeting the demands for support and assistance. The use of technological tools, in fact, may represent an evolution in several clinical conditions, especially in the treatment of anxiety disorders. In fact, psychotherapy is one of the most interesting and promising areas of Virtual Reality application.

The VRET has become an important therapeutic tool for mimicking relevant social situations within a therapeutic setting and has been shown to have the potential to elicit patients' social distress (Kampmann *et al.*, 2016). Anxiety-related disorders are the most prevalent class of mental disorders, especially considering the effects of the pandemic (35.1% in the general population) (Huang & Zhao, 2020). NICE guidelines (2013) suggest selective serotonin inhibitor drug therapy (SSRI) and cognitive behavioural oriented psychotherapy (CBT) as elective treatments in anxiety disorders. CBT is based on the use of experiential, in vivo or imaginal exposure techniques that expose the subject to the feared situation or object. In this way, the exposure is intended to correct the individual's dysfunctional beliefs about his or her ability to cope with the feared stimulus and to reduce its threat. Exposure-based therapies are indicated for the treatment of obsessive-compulsive disorders (OCD), post-traumatic stress disorder (PTSD), panic disorder (PD), specific phobias, and social anxiety disorder (SAD; APA Presidential Task Force on Evidence-Based Practice, 2006), however, some exposures may sometimes be impractical. VRET is proving to be a viable alternative, useful in overcoming possible structural limitations (Fernandez & Riva, 2020). VR represents a perfect tool to foster experiential learning; the therapist exploits the simulation power of VR, which can induce emotional responses (Vincelli *et al.*, 2001; Vincelli & Riva, 2007) with the advantage of being in a protected environment (Wilson & Soranzo, 2015). Virtual reality (VR) technology offers a unique opportunity to spread exposure therapy. The technology is improving so that the image quality is better, and the cost is much lower than traditional psychotherapy (Miloff *et al.*, 2016).

One study showing that 76 percent of participants chose VRET over in vivo exposure (Garcia-Palacios *et al.,* 2007). Its effectiveness comes from its applicability to different everyday life situations *(*Morina *et al.*, 2015), the possibility of personalizing the multisensory content of stimuli capable of eliciting emotional states of fear (Loucks *et al.*, 2019), remaining within the therapist's office. The use of a virtual environment allows, in addition, greater control of environmental variables by the therapist, who can modulate the form and frequency of stimuli (Scozzari & Gamberini, 2011) according to exposure hierarchies agreed with the patient. The participant responds to relevant

stimuli while immersed in a larger virtual environment that can be controlled, differing from traditional experimental settings, where relevant stimuli can be controlled but the surrounding environment often cannot. Rizzo *et al.* (1999) describe virtual environments as "the ultimate Skinner box," capable of presenting a range of complex stimulus conditions that would not be easily controlled in the real world and allowing examination of both cognitive (e.g., attention) and search processes (Rizzo *et al.*, 2004).

A recent meta-analysis (Carl *et al.*, 2019) reported improved anxiety symptoms and reduced anxiety crises following VRET use. In the study, repeated virtual and gradual exposure to feared stimuli led to changes in cognition, behaviours, and emotional and physical responses. Exposure facilitates the extinction of the fear response. It helps to modify dysfunctional evaluations of threat, reducing the conditioned anxiety associated with feared stimuli (Abramowitz, 2013; Foa & Kozak, 1986). Gradual exposure allows habituation and reassessment of threat. Extensive research demonstrates the effectiveness of treatment in phobias (Abramowitz *et al.*, 2011; Ougrin, 2011). Meta-analysis (Carl *et al.*, 2019) supports the use of VR for social anxiety disorder, performance anxiety, and panic disorders. VRET has also been used in several additional areas of anxiety from stress management (Pallavicini *et al.*, 2016; Shah *et al.*, 2015) to generalized anxiety disorders (Repetto *et al.*, 2013).

Process variables in anxiety outcomes

A few variables that might influence the effects of virtual reality exposure therapy in anxiety outcomes were analysed. A central process aspect affecting treatment outcome is the therapeutic alliance between therapist and client. Because of its modest but stable ability to predict treatment outcome, therapeutic alliance has become one of the most studied process variables in research. One study (Meyerbröker *et al.*, 2008) investigated the mediating role of the therapeutic alliance in 14 patients with fear of flying. The purpose of the study was to test if the quality of the therapeutic alliance could predict successful outcomes in VRET. The results showed a positive correlation between therapeutic alliance and treatment outcomes as reduction of anxiety

symptoms. Similarly, Ngai and colleagues (2015) reports a positive association between the anxiety reduction and therapeutic alliance, as observed in studies using face-to-face interventions. The results overcome the controversy arising from the lack of eye contact due to technological devices (helmet) (Meyerbröker *et al.*, 2008; Wrzesien *et al.*, 2015).

Morina *et al.* (2014) notes how virtual reproduction of social interactions through VRET can activate in individuals both symptoms of anxiety and the sense of presence, understood as "being inside" the virtual context, characteristic of in vivo interactions. However, the study shows how the sense of presence is not an indicator of the onset of anxiety symptoms (Morina *et al.*, 2014). Moreover, the subject might experience the virtual environment as unrealistic, resulting in a low sense of presence, but still experience anxiety symptoms due to the presence of the therapist as a source of negative judgment especially in subjects with social anxiety (Morina *et al.*, 2014). Therefore, contrary to most hypotheses, the sense of presence is a necessary but not determinant condition in the effectiveness of intervention with VRET. Similarly, more empirical evidence is needed (Fernandez *et al.*, 2020). It is assumed that there might be differences between adults and children in the level of engagement within the experience elicited by virtual reality (Bercea, 2021).

Some evidence also suggests that in addition to therapeutic alliance, patients' positive expectation of outcome also plays a role in improving the outcome of interventions in VRET. Prince and colleagues (2008) shows that higher positive expectancy toward treatment in VRET led to greater symptom reduction in self-report measures.

Outcome in adults with social anxiety

Most studies show that VRET in subjects with anxiety disorders, including social anxiety, is superior to the control group under waitlist or psychological placebo conditions, with results fairly comparable to those with in vivo exposure (Carl *et al.*, 2019), even in drop-out levels (Anderson *et al.*, 2013; Benbow *et al.*, 2019; Fodor *et al.*, 2018). Parsons and Rizzo (2008) evaluated the effectiveness of VRET in social anxiety disorder reporting a decrease in symptoms; however, the

lack of a control group limits the evaluation of its effectiveness. The review by Powers *et al.* (2008) also found comparable results, obviating the limitations of the previous study. Based on the available results, there are no significant differences at post-intervention between in vivo and VR protocols; however, the efficacy of VRET may decrease in the long term (Anderson *et al.*, 2013).

VRET in adolescent with social anxiety

Social anxiety is among the most common mental disorders and is characterized by an excessive concern about being exposed to the negative judgment of others in specific social and performance situations. The individual is frightened by the possibility that others may notice the characteristic manifestations of the neurophysiological arousal of anxiety (APA, 2013). This results in impairment in daily and relational functioning, such as difficulties in school, limited or absent social relationships (Maes *et al.*, 2019; Vilaplana-Pèrez *et al.*, 2021).

Social anxiety seems to occur more often among adolescents, with a prevalence of about 9 percent (Birstein *et al.*, 2011) and an onset that averages around age 13 (Kessler *et al.*, 2005). Adolescents, defined as "digital natives," continually fluctuate between the real relational and digital worlds (Chandra, 2016), and this facilitates the expression of experiences using the symbolic language of technology. Emblematic are virtual reality interventions that combine creative arts, such as painting and sculpture, in the treatment of social difficulties (Zeevi, 2021).

Studies on VRET are still limited although they show enough promise (Kothgassner & Felnhofer, 2021). An early study of the feasibility of VRET interventions on public speaking anxiety (Kahlon *et al.*, 2019) evaluated the effectiveness of a single-session virtual exposure intervention in adolescents (13-16 years old). The intervention proved effective in terms of reducing scores in the behavioural, cognitive and physiological dimensions of public exposure anxiety. The study proves the still controversial effect of "feeling present" as a moderator in treatment outcome.

An additional study of adolescents evaluated the feasibility of VR interventions in individuals with social anxiety (Parrish *et al.*, 2016).

The intervention proposed two public scenarios, during a party and in a public speaking context, which demonstrated total immersion of subjects to the point of eliciting the experience of anxious distress typical of real-world situations. Cast in the different environments of everyday school life (e.g., classroom, gymnasium, hallway, etc.), the study by Sarver and colleagues (2014) in which social interaction situations with people of different ages, roles, and ethnicities were virtually reconstructed is significant. The social demands were related to four tasks: conversation initiation, conversation maintenance, giving and receiving compliments, and demonstrating assertiveness. These skills were taught and then tested in a virtual context, and the environmental stimuli were under the control of a therapist who modulated the verbal and nonverbal responses of the virtual characters, i.e., the pace and difficulty of the interaction. The protocol included virtual exercises at home as well. The intervention showed feasibility and credibility by both young participants and parents. These results were also maintained in research that implemented the technology of the previous study using avatars, refined the virtual environment including more play controls by the subject and eliminating complete control by the therapist (Beidel *et al.*, 2021).

Ethical issues have been raised in the use of virtual reality in children and adolescents. Effects are noted on the physical level, such as cybersickness, sleep-wake or eating alterations and visual disturbances, brought about by the blue light emanating from the devices and reduced physical activity; on the psychosocial level, alarm is mainly directed toward the possible development of pathological forms of addiction (Kaimara *et al.*, 2022). In any case, it is recommended to limit the use of the devices to minors 13 years of age and older (Yamada-Rice *et al.*, 2017).

School phobia in adolescent: the use of the VRET

Gradual and nongradual exposure techniques have also been found to be effective in treating context-specific phobias, such as school phobia. School phobia is characterized by elevated levels of anxiety and fear of school-related events. The consequence of this phobia is often chronic refusal to attend school, to avoid adverse events such as public

speaking, giving examinations but also events related to fear of being bullied or experiencing social difficulties. Avoidance can lead to consequences in emotional and social development by increasing the risk of significant impairment of a person's mental health. Clinical practice with children suggests the need for flexibility and creativity. Virtual reality meets these requirements; moreover, being interesting, it increases children's motivation to take part in treatment. As early as 2005, Wiederhold and colleagues proposed treatment procedures for school phobia based on virtual reality. In a simulation set in school, children performed exercises aimed at developing coping skills; the exercise was, then, repeated in a virtual and protected environment until adequate results were obtained. J. Gutiérrez-Maldonado and colleagues (2009) developed a series of virtual environments that could be effective in treating children with school phobia using a sample of 36 children aged 10 to 15 years. The first phase consisted of creating an avatar. The anxiety-triggering elements and situations included in the settings were selected based on the most up-to-date scientific literature related to the most often encountered school fears and concerns. Each environment, to which they were exposed, had two levels of interaction: easy and difficult, depending on the performance required and the level of anxiety generated by the stimuli. The first environment was the school (hallways, outdoor courtyard, entrance, and the doors of different classrooms). Depending on the level chosen, there were two or more interactive characters with whom it was necessary to communicate to find specific locations. The exercise ended with the ringing of the bell. The second environment was the classroom. Where the level of difficulty is determined by the type of response of the avatars simulating fellow students and the teacher. In the proposed exercises, the child had to first introduce himself and then, interact with classmates who were kind and forgiving in the easy level and intimidating in the difficult level. Post-treatment results show a significant decrease in school-related fears supporting the effectiveness of virtual reality and customized environments to address and treat fears and anxieties related to the school setting. Other anxiogenic stimuli to which it is possible to be exposed at school are situations in which public speaking is required. This is one of the most common fears that is accompanied by trembling, blackouts, fear of saying something nonsensical and of not being understood (Grant *et al.*, 2005). Kahlon and

colleagues (2019) subjected 27 adolescents between the ages of 13 and 16 to VRET. During the sessions, participants had to give speeches in an environment depicting a classroom full of students. The results showed a decrease in anxiety symptoms and better coping with the situation they were exposed to.

Vret application in other clinical contexts

The recent development of new VR hardware and software has led to increasing use of these tools in research and treatment of other forms of psychological distress. VR allows patients to learn through reflection on how to do it. Through this experience, it is easier for the therapist to prove to the patient that what seems like fact is a product of his or her mind. Once this concept is understood, individual maladaptive assumptions can be more easily challenged.

Nutrition and eating disorders

In recent years, virtual reality has offered innovative solutions in reducing food cravings, improving body image, and managing emotions in eating disorders (Riva *et al.*, 2016, Riva *et al.*, 2019). Controlled studies have shown at long-term follow-up greater efficacy of VR treatment in the context of eating disorders and obesity than classical cognitive behavioural treatment (Cesa *et al.*, 2013; Ferrer-Garcia *et al.*, 2019; Marco *et al.*, 2013; Manzoni *et al.*, 2016). The first application of virtual reality in this field was in body image research (Saffo *et al.*, 2020). The possibility of developing applications that explore body representations has advanced due to technological development and the use of increasingly realistic and interactive avatars. The ability to change size, weight, and other body characteristics has proven to be of great help to the therapist who can thus explore, for example, the perceived body, the desired body, healthy weight, and subjective weight. The results showed a positive correlation between different scenarios and body image dissatisfaction. In this perspective, VR can be used to represent stressful situations by providing information to the therapist about patients' subjective view of their bodies (Riva *et*

al., 2019). A recent neuroscientific model suggests that eating disorders may reflect a deficit in the processing and integration of multisensory body representations and signals (Riva & Gaudio, 2018; Riva & Dakanalis, 2018). VR allows working on impaired body integration through two strategies:

- *Reference frame shifting*, attempts to change the individual's body self-awareness through focusing and reorganizing body-related memories. This is possible by having the subject relive a negative body-related situation, giving him or her the opportunity to relive it as a spectator or as a protagonist (Akhtar *et al.*, 2017; Riva, 2011);
- *Body swapping* looks to induce in the subject the feeling of owning the virtual body with a different size and shape. This strategy is often coupled with classic Cognitive Behavioural Therapy, CBT, (Gutiérrez-Maldonado *et al.*, 2016*;* Normand *et al.*, 2011).

Finally, virtual reality can be used to reduce anxiety related to food by interrupting the consolidation of negative memories related to food and going to modify the craving itself (Riva, 2017).

Psychosis

VR has also shown effectiveness in the treatment of psychotic disorders, especially in understanding the psychological mechanisms underlying symptoms (Valmaggia, 2017). In studies by Valmaggia (2016) and Rus-Calaffel (2018), VR was used to recreate in a controlled environment the effects of adverse events on the response to social situations. Again, using virtual scenarios it is possible to assess the subject's functional capacity, cognition, and social competence (Freeman *et al.*, 2017). Accordingly, the literature suggests the virtual environment as a safe place in which psychotic symptoms can be assessed (Rus-Calafell *et al.*, 2018; Valmaggia *et al.*, 2016).

More recently, virtual reality treatment has been used to improve cognitive abilities, such as memory and attention, alongside cognitive remedial interventions to reduce symptomatology in patients with psychosis. In cognitive rehabilitation, VR allows the use of a more innovative and motivating approach that can engage the participant more. It gives, in addition, the possibility of creating standardized and reproducible therapeutic environments. The goal is to improve cognitive

processes resulting in improved daily functioning, develop problem solving strategies and social and interpersonal skills (Fernande-Sotos *et al.*, 2020, Wykes & Spaulding, 2011). The study by Wim Veling and collaborators (2016), highlighted how virtual reality-based cognitive behavioural therapy is helpful in reducing paranoia and delusional symptoms. In the study, 170 patients diagnosed with psychosis and healthy controls were examined. The purpose was to test social stress sensitivity by walking 5 times in a virtual bar with different levels of environmental stress determined by population density, ethnic density, and hostility. There were 16 sessions lasting about one hour. The results showed a significant reduction in paranoid symptoms both after treatment and at a 6-month follow-up, while also recording an improvement in interpersonal functioning. In contrast, participants in the control group who underwent classical treatment showed an increase in symptoms. Despite the low number of published studies, all studies had promising results with short-term improvements in social skills and/or social cognition (Fernández-Sotos *et al.*, 2020) with reduction in symptomatology.

Addictions

The first application of VR in addiction was in 2005 in a study conducted by Bordnick and collaborators. The researchers, using virtual environments, assessed craving and responsiveness to desirable cues such as drugs and substances. All participants were exposed to the predicted signs and their responses were measured in subjective and objective terms (drug craving and physiological responses). VREt allows patients to be exposed to situations they say are unbearable. Repeated practice gives patients the opportunity to learn to control their reactions, identifying alternative stress management strategies that they can apply in the real world. The goal of therapy in individuals with addiction is to develop useful defence mechanisms to cope with risky situations. By virtually replaying stressful situations such as bars, casinos, or pubs the subject can develop useful tools to manage these environments (Baumann *et al.*, 2006). For example, in the VRET used in Girard and colleagues' (2009) study, people were asked to virtually crumble cigarettes, with the aim of reducing craving in tobacco-

dependent subjects. The results of this study show a significant reduction in nicotine use in only four weeks of treatment, as well as a low dropout rate.

Discussions and conclusions

The application contexts of virtual reality are quite broad and span technology, industry and health. In the healthcare sector, the use of VR in evaluation and treatment is becoming established (Duarte *et al.*, 2020; Koning *et al.*, 2009) demonstrating its usefulness in various clinical settings, starting with the treatment of anxiety disorders. Virtual reality provides a real-world experience by creating a virtual experience as close to the everyday as possible. These experiences improve an individual's functionality by promoting the enhancement of cognitive abilities.

VR experiences also emotionally engage the user in the situation. In fact, VR allows for a sense of well-being, due to the stimulation of multiple perceptual channels, implemented using auditory and visual feedback, which stimulate the patient's awareness of their own performance. The overall VR experiences allow for improved motivation, program compliance and treatment effect. Finally, it can also be tailored to the subject's needs. Since psychological assessments and interventions depend primarily on active interaction between therapist and patient, virtual reality adds an edge to these interactions by making the process more effective. Virtual reality offers the opportunity to assess human behaviour as accurately as possible through precise testing and controlled training. The new form of exposure carries some advantages over traditional techniques: greater privacy than other in vivo exposure techniques, lower costs, greater control over exposure parameters; it also allows for situations beyond what is possible, facilitates self-training and overlearning, etc. (Alsina-Jurnet *et al.*, 2007; Gutiérrez-Maldonado, 2002).

With the rise of open access apps and software, one can assume the increasing use of these self-guided virtual reality tools without the presence of professionals guiding the exposure exercises. Indeed, evaluating such intervention protocols without the presence of a therapist could provide greater insights into the feasibility and

effectiveness of treatments. Funded collaboration with engineering, programming, and computer professionals could enable the production of increasingly specialized digital products for the treatment of mental disorders, increasing the availability and impact of these tools (Sarver *et al.*, 2014) even within public clinical settings. Indeed, one possible new approach is the combination of VRET interventions with transcranial magnetic stimulation (TMS), transcranial direct current stimulation (tDCS). As shown by several studies, neurostimulation of the dorsolateral prefrontal cortex (DLPFC) influences processing and memory of visual emotional stimuli (Balzarotti & Colombo, 2016). In this light, the combination of VRET and neurostimulation may improve the clinical effectiveness of this approach (Riva *et al.*, 2019; Notzon *et al.*, 2015; Wout-Frank *et al.*, 2019).

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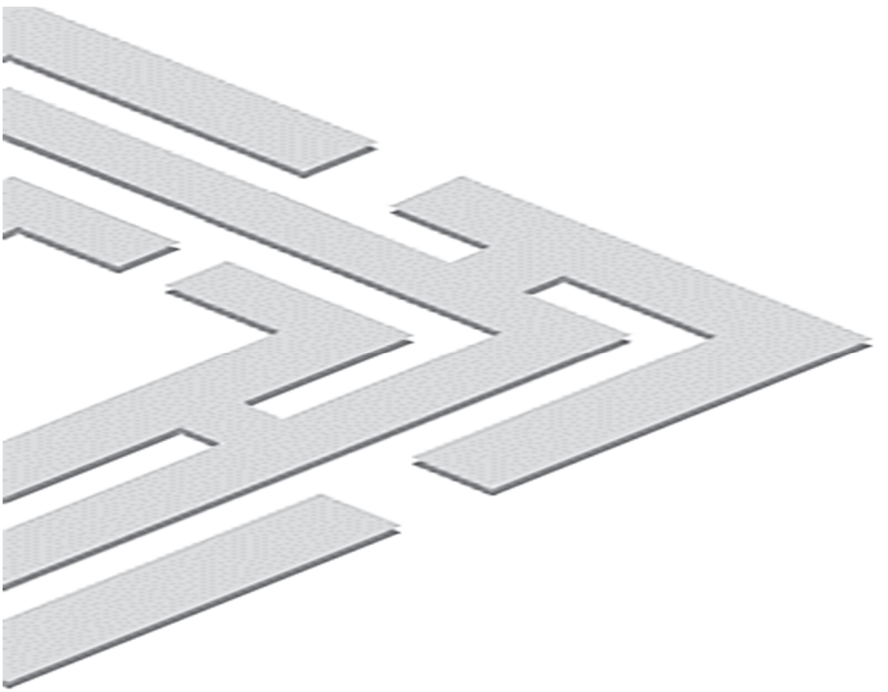
COMMENTARIES*



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Trajectories of support intervention in clinical psychology

Maria Francesca Freda[*], *Ersilia Auriemma*[*], *Cristiano Scandurra*[*]

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Abstract

The present paper aims to discuss the request of the National Council of Italian Psychologists for a definition of the typical acts of psychologists in the clinical field by commenting on the work of Castelnuovo *et al.* (2023). In particular, we aim to contribute to the current debate by addressing primarily supportive interventions in the clinical setting, focusing on: (1) defining the supportive intervention among the typical acts of the psychologist; (2) adopting a methodological criterion to distinguish between supportive intervention as a psychological-clinical act and psychotherapeutic intervention; and (3) articulating of the discourse in relation to the adoption of narrative methods in clinical intervention. In particular, in this work we argue that supportive interventions are adopted in critical situations, where dysregulation of psychological functioning processes is assumed, and they use the narrative device by promoting a connection between mental states and an articulation of affects in shared meanings. Instead, psychotherapeutic interventions are adopted in conditions of distress and/or psychopathology and use the narrative device in light of an inverse trajectory of sense, that leads from behaviors and representations to the understanding and transformation of the affective matrix of experience. Thus, supportive intervention may be defined

[*] Department of Humanities, University of Naples Federico II (Italy).

Corresponding Author: Maria Francesca Freda, Dipartimento di Studi Umanistici, Università degli Studi di Napoli Federico II, Via Porta di Massa 1, Napoli 80133 (Italy). Email: fmfreda@unina.it

as a process in which the clinical relationship serves as *scaffolding* for psychic functions in the direction of their development and integration.

Keywords: psychological support intervention, psychotherapy, narrative, clinical relationship, clinical psychology

Introduction

Recently, the Commission on Typical Acts of the National Council of Italian Psychologists (NCIP) asked a group of national experts for an opinion on the definition of typical acts for psychologists (i.e., prevention, habilitation, rehabilitation, and support activities), specifying their objectives, methodology, procedures, and actions, with particular attention to the clinical field in distinction to psychotherapy. The opinion was published by Castelnuovo *et al.* (2023) in *The Italian Journal of Clinical Psychology* and triggered a lively and stimulating debate in the scientific community on the boundaries and specificities related to psychology, the clinical field in which psychologists work, and psychotherapy.

There are various ways to participate in a discussion: the approach we chose is to place the general question within the specific framework of one's own field of study and expertise (Freda, 2009) by trying to formulate specific issues and then verify if they can contribute to the broader debate in terms of general utility. In this paper, we will attempt to elucidate the NCIP's question by commenting on the work of Castelnuovo *et al.* (2023) in light of three specific foci: (1) definition of supportive intervention among the typical acts of the psychologist; (2) adoption of a methodological criterion to distinguish between supportive intervention as a psychological-clinical act and psychotherapeutic intervention; and (3) articulation of the discourse in relation to the adoption of narrative methods in clinical intervention.

In relation to the first focus, we have chosen to look at supportive intervention because of the current innovative articulations of the psychological profession, for example in primary care psychology. These articulations increasingly refer to psychological support interventions, which by definition are not psychotherapeutic interventions and are one of the typical acts of the psychological profession. However,

unlike psychotherapeutic interventions, there is currently no clear definition of what constitutes a psychological support intervention in the clinical field. As for the second focus, we believe that the difference between psychological-clinical interventions and psychotherapeutic interventions can be better understood by looking at the methodological criteria they use — namely what they aim to "change" within the clinical relationship and how they do this. Finally, the third focus concerns the anchoring of discourse in the use of narrative devices in clinical practice through which we will examine the differences between the typical act of support performed by a psychologist working in a clinical setting and psychotherapeutic intervention. The interpretive framework we have chosen is that of narrative psychology, which is consistent with our background and expertise. In our paper, we will adopt this perspective to illustrate the various trajectories of the use of narrative device based on the type of intervention and, in particular, on the different psychological health needs and, consequently, on the different objectives of the intervention.

In the following paragraphs, we will first provide a brief overview of the current debate on the typical acts of the psychological profession, focusing specifically on the typical acts of psychological support in the clinical field and distinguishing these from psychotherapy. We will then discuss the narrative perspective in clinical psychology. Finally, we will propose a possible articulation of the typical act of psychological support in the clinical field and the psychotherapeutic act in the light of the narrative perspective in terms of methodological criteria and intervention goals.

Psychologist's typical acts: The "case" of psychological support

As is clear from the document by Castelnuovo *et al.* (2023), the professional figure of the psychologist in Italy is regulated by Law 56/89, which refers to a unified professional profile with no distinction between different areas of intervention (e.g., social, educational, organizational, legal). This legal situation implies that a licensed psychologist can work in all areas of intervention and, from a purely legal point of view, the concept of "clinical psychologist" does not actually exist. What does exist, however, is a psychologist working in a clinical

setting. In other words, clinical psychology (just like school psychology or legal psychology, for example) is an area of intervention for psychologists, and to quote directly from Castelnuovo *et al.* (2023, p. 17), it is:

> the exercise of the psychological function of knowledge and intervention within the clinical domain, the latter as the set of typical and atypical intrapsychic and relational, individual, couple, family, group, and institutional processes that govern the lives of individuals and groups in aspects related to subjectivity and its externalization (e.g., sense of personal accomplishment, the use of cognitive and emotional skills for the purpose of active adaptation, and the ability to entertain meaningful and beneficial relationships for well-being).

Following this line of reasoning, which aims to distinguish the clinical field from other areas of psychologists' action, the clinical field is defined by both the object of the intervention and the setting. Regarding the object of the intervention, Castelnuovo *et al.* (2023) argue that the clinical field «consists of the intrapsychic, interpersonal, and contextual processes, factors, conditions, and phenomena (…) related to and/or substantiating states of psychological distress and discomfort» (p. 17). The object, therefore, is represented by psychological distress or discomfort. As for the setting, clinical psychological intervention involves professional operations made possible by the mediation of settings that operate at the interpersonal and/or microsocial level. The regulation of these settings requires «interpretive models, methods and techniques designed because of the subjective and intersubjective processes that characterize such human forms» (Castelnuovo *et al.*, 2023, p. 19). Looking at the clinical field from this perspective implies that the specificities of this field do not concern the general functions performed by psychologists (e.g., support, prevention, etc.) or the methods used to perform these functions (e.g., interviews, tests, etc.), but rather the problems to address (i.e., the object) and the organizational formats co-constructed with the user (i.e., the setting).

The situation of psychotherapy is different, since it stands out as a specialized activity within clinical psychology, which requires a third-level training. Also in this case, according to Castelnuovo *et al.* (2023), what distinguishes the psychotherapeutic field from all other

psychological fields is the object that motivates specialized professional action: the treatment of psychopathology. However, we believe that the cure or treatment of psychopathology is a goal of intervention rather than an object. In this reasoning, we find support in the definition of "supportive intervention" given by Castelnuovo *et al.* (2023, p. 24), which is the focus of the present:

> Supportive interventions are not aimed at modifying the psychopathological condition, but at enhancing opportunities for adaptation within the constraints given by that condition (…). Such interventions therefore fall within the clinical psychology, not psychotherapy, domain.

It seems to us that this definition distinguishes the two types of interventions (supportive intervention vs. psychotherapy) on the basis of different intervention goals (i.e., improving adaptive capacity vs. treating psychopathology, respectively) rather than on the basis of the object (psychological distress vs. psychopathology). We share this view and would like to express it in our contribution in terms of a methodological trajectory. With reference to the second focus of this paper, we therefore argue that the goals of any intervention, whether psychological-clinical or psychotherapeutic, should be pursued on the basis of specific methodological criteria. In an attempt to broaden this definition by setting out more decisively the methodological specificities of supportive intervention in the clinical field, we have therefore turned to the scientific literature, but have been profoundly disappointed.

The work that seemed to focus most on the topic we are dealing with is by Serge Lecours (2007). The author approaches supportive intervention from a psychoanalytic perspective and shows how effective and necessary it is with patients who have difficulties with the symbolic functioning of the mind. However, Lecours (2007) refers to supportive interventions in the context of psychoanalytically oriented psychotherapy and suggests a distinction between support and interpretations, the latter being more appropriate for patients with good symbolic functioning of the mind. According to Lecours (2007), supportive interventions are appropriate for individuals who exhibit psychosomatic symptoms, who are prone to acting out or who experience significant personality disturbances. From this perspective, which

seems to prioritize the nature and extent of the problems presented by patients as well as the varied use of techniques, supportive interventions aim to transform non-symbolic contents of the mind into symbolic and meaningful contents. This is to be achieved through pragmatic and interactive communication modalities. Although Lecours' (2007) point of view is valid in the context of psychotherapeutic work, it does not seem sufficient to include supportive interventions that do not take place in a psychotherapeutic setting.

Unlike the work of Lecours (2007), many other scientific studies emphasize that psychological support as an intervention, not necessarily in the context of psychotherapy, is effective in promoting health. However, these studies often do not conceptually define what is meant by a "psychological support intervention." Instead, they primarily present empirical data supporting the use of psychological support for specific conditions, such as chronic illness (e.g., Hossain *et al.*, 2021; Reynolds *et al.*, 2018; Sansom-Daly *et al.*, 2012), life events that cause sudden changes (e.g., pandemics, bereavement; e.g., Bertuzzi *et al.*, 2021; Johannsen *et al.*, 2019), or environmental conditions where a family member has significant health problems that challenge the system (e.g., Selwood *et al.*, 2007; Thompson *et al.*, 2007).

Despite the lack of conceptual definitions, we seem to recognize a common dimension in all studies to consider psychological support intervention as a specific type of intervention that can be proposed to support the phases in which a period of vulnerability and disorganization of mental processes occurs after a critical event (Flannery & Everly, 2000). Furthermore, another common dimension often highlighted in the scientific literature is that the activation of narrative processes and meaning making in response to critical events and conditions, as facilitated by psychological support interventions, may be related to health, adjustment, and developmental outcome (Park, 2010). This point leads us to the third focus of the current paper.

The narrative perspective in clinical psychology

Discussing narrative in psychology draws on the historical contribution by Bruner (1990). Bruner emphasizes that when the human mind grapples with a critical experience, it creates a narrative urgency — a drive to seek a tolerable and intelligible meaning for that specific experience. Through narrative, people construct a coherent life story, integrate multiple meanings attributed to different events over time, position themselves from a subjective perspective to make connections between their mental states and external events, and ultimately shape their identity and life story (Fivush *et al.*, 2017; McAdams & McLean, 2013; Neimeyer, 2004).

The relevance of narration for the construction of the self and one's relationship to life experiences makes it a particularly effective methodological tool in the clinical setting, whether in interventions aimed at helping people cope with critical experiences or in psychotherapeutic approaches aimed at treating psychopathologies.

In terms of supportive interventions, we think, for example, of psychological interventions that use expressive writing as a method (Pennebaker, 1997). The possibility of expressing emotions associated with painful or challenging life experiences in narrative form seems to enable their integration into the personal story (e.g., Lu *et al.*, 2018). We also think of autobiographical writing used in psychological interventions to promote the integration and processing of critical experiences. This type of narrative, when conducted in a clinical setting, allows to explore the autobiographical disruption caused by painful experiences and to identify the individual's point of view in his or her own life, also capturing how the critical experience fits into the temporal perspective of one's existence (Kelley & Clifford, 1997; Piana *et al.*, 2010). Along this line, a fairly recent review of the use of narrative interventions for patients with chronic illnesses emphasizes the role of narrative devices as facilitators of *meaning-making* processes (Gucciardi *et al.*, 2016).

Regarding psychotherapeutic interventions, narrative has been used as a specific methodological tool starting from the narrative therapy (White & Epston, 1990). Narrative therapy is conceptualized as a "re-authoring" process that aims to construct narratives of the self that are more flexible and complex, incorporating contradictory and

ambiguous aspects inherent in human experience. Cognitive models also make extensive use of narrative. Those based on a hermeneutic-constructivist approach, which is a narrative elaboration of Kelly's (1970) theory of personal constructs, view psychotherapy as a process aimed at co-constructing a new narrative reality based on an understanding of the meaning of symptoms (Chiari & Nuzzo, 2010). Other cognitive models use narrative tools to support mindfulness by promoting access to new meanings through both bottom-up processes (bodily sensations are seen as knowledge tools from which narratives are constructed) and top-down processes (narratives as a starting point for exploring emotions and bodily sensations) (Rodríguez Vega *et al.*, 2014). Narrative is also an important aspect in the Di Maggio *et al.*'s (2015) interpersonal metacognitive therapy, which focuses on recognizing interpersonal patterns through narratives of life episodes. Finally, narrative is also an important aspect in psychoanalysis and psychodynamic psychotherapy. For example, Schafer (1980) argued that individuals construct narratives to make sense of their lives and that analyzing these narratives can provide insights into their psychodynamic processes; Spence (1984) developed the concept of "narrative truth" (i.e., subjective, personal narratives that individuals construct about their experiences) and distinguished it from that of "historical truth," which reflects objective and factual events; Corrao (1991) viewed the psychoanalysis as a practice that aims to transform sensory and emotional experiences into thoughts and meanings; and Ferro (2014) emphasized how the psychotherapeutic encounter aims to change the narratives constructed in the intersubjective analytic field.

Based on what we have discussed, we believe that it is possible to define narration as a function of the mind that, through the transformation of experiences over time, can support the psychological adaptation of individuals, especially in the face of critical and somewhat overwhelming experiences that, being outside the ordinary, require psychological work to reorganize and integrate in order to be processed (Freda *et al.*, 2023). The narrative works we have conducted over time and through theory-driven qualitative research methods (e.g., De Luca Picione *et al.*, 2017, 2018; Martino *et al.*, 2023a, 2023b) have allowed us to identify, based on the scientific literature, at least four specific functions that narrative fulfills in relation to critical experiences (Figure 1).

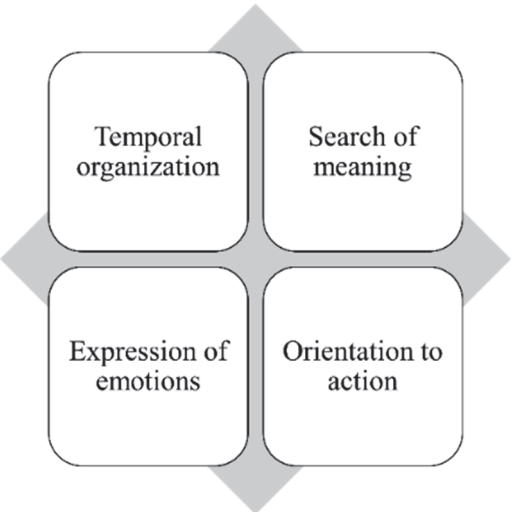

Figure 1. Narrative functions

The first function, *temporal organization*, is an organizational function, or rather a function that aims to order events primarily in temporal but also in spatial terms (Brockmeier, 2000; Crossley, 2003; Williams, 1984). From this perspective, narrative serves to inscribe the experiences we have into the time of our existence and to establish connections between the present, the past and the future. Critical states often lead to a kind of "absolute present" that freezes one's life story in a single temporal dimension. Narration therefore makes it possible to reconnect with the past and envision the future.

The second narrative function is the *search of meaning* (Frank, 1995; Williams, 2000) which in the case of experienced critical conditions could be summarized in the question "Why did this happen to me?" In this sense, narrative might enable us to search for an answer to this question by revealing the meaning of events that seem meaningless. This means that narrative processes allow us to reclaim a critical experience and transform it into something relevant and meaningful. Cognitive theorists would speak of *benefits finding* (Tennen & Affleck, 2022), or rather the possibility of recognizing a benefit from a critical or traumatic experience and thus putting it at the service of the self.

The third function is the *expression of emotions* and reflects how the narrative makes it possible to name and differentiate emotions and feelings and to link them to specific events and contexts (Greenberg & Pascual-Leone, 2001; Tronick, 2010).

Finally, the fourth function is *orientation to action*, or agency (Brockmeier, 2009; McAdams, 2013). It reflects the opportunity the narrative offers to construct our own decision-making and to guide our actions in response to a critical event.

It can be argued that these four specific narrative functions fulfill an overdetermined function that is particularly evident in situations in which a person is confronted with a critical event, i.e., an event that represents a deviation from the norm (Bruner, 1990) and for this reason creates a narrative urgency. We refer to the function of making sense of what has happened. To unfold this point, we turn to the integration of a semiotic and socio-constructivist view of the mind into the narrative perspective, according to which narrative is one of the processes through which the affective, generalized, embodied, and preverbal sense of experience can be transformed into a shared and symbolizable meaning. The attribution of more or less complex meanings to life experiences could thus be the result of a narrative articulation process that begins with a homogenizing and generalizing affective and embodied investment in the experience that we call "sense" and moves toward a direction of discretization, transforming the "sense" of an experience, which may only felt and not thought, into the "meaning" of the experience, something mentally represented and thought (De Luca Picione & Freda, 2012; Freda *et al.*, 2023). In this process, narrative functions play the role of mediators between sense and meaning. In Figure 2, we have attempted to graphically represent the narrative articulation process that involves the transformation of sense into meaning.

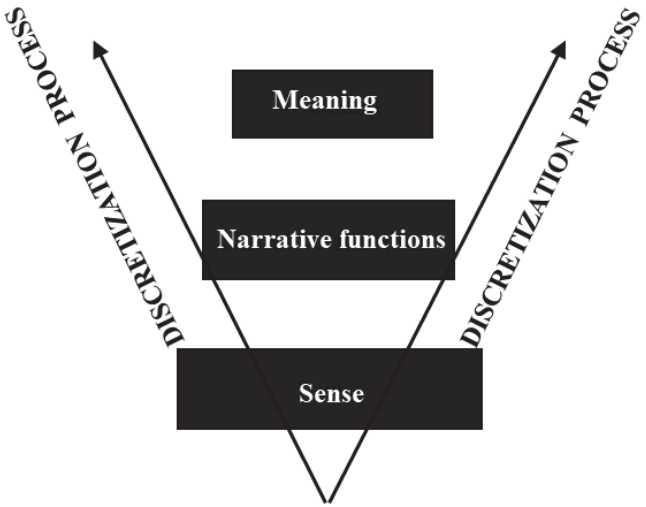

Figure 2. Narrative articulation process

A "narrative proposal" on the trajectories of psychological support in clinical field and psychotherapy

If we attempt to apply the theoretical framework we have used to psychological or psychotherapeutic interventions, we believe that the actions of a psychologist working in a clinical field and those of a psychotherapist differ primarily in how the professional uses the narrative and its underlying narrative context, i.e., the goal of the intervention.

In light of defining psychotherapy as an act of the clinical psychologist aimed at treating psychopathology, the use of narration will be consistent with this objective if it enables the activation of a movement from the superficial – understood as that which emerges from the client's narrative (i.e., the *meanings*) – to the profound (i.e., the *sense*). In other words, the narrative that the client and the psychologist construct together in the psychotherapeutic relationship organizes a process of "search for meaning", starting from the meanings that emerge from the client's story, which includes the representation he/she has of him/herself, his/her relationships, and his/her symptoms. It is therefore a process of reorganization and restructuring of the self that

progresses through the construction of the psychotherapeutic discourse as a space in which individuals can recognize and gradually transform their subjectivity towards a deeper understanding of themselves and their way of being in the world, reducing the manifest symptoms that were often the cause of the request for help.

It is important to emphasize that the narrative movement towards the search for meaning can be interpreted within different theoretical models of the mind. In particular, in the psychodynamic perspective, it could be the gradual narrative production of what could not be consciously thought because it was too emotionally painful and therefore repressed or denied (e.g., Ferro, 2014). In the cognitive perspective, it can be seen as the awareness and restructuring of schemas related to the self and relationships (e.g., Di Maggio *et al.*, 2015). In the systemic-relational perspective, on the other hand, it could be the patients' understanding of their cognitive and emotional representations of early relationships with caregivers based on their narrative modalities and coherence (Dallos, 2004). In summary, we believe that what ultimately characterizes the narrative context of a psychotherapeutic intervention, regardless of the theoretical model of the mind, is the direction of the therapeutic work, which moves from meaning towards sense.

In our view, the direction of the narrative process that characterizes psychological support in a clinical setting is rather the opposite. It is necessary to re-emphasize here that the aim of psychological support, as highlighted by NCIP (2015), is:

> improving the quality of life and *adaptive balances* of individuals [our italics] in all situations (both health and illness), as deemed appropriate, by developing and enhancing their strengths and capacities for self-determination. This requires assessing the balance between the individual's disabilities, resources, needs and expectations.

We believe that the attention given to "adaptive balances" emphasizes the need to promote the adaptation of individuals and communities in the face of situations in which a reordering of oneself, one's resources and related contexts may be required. For this reason, we believe that the specific focus of a psychological support intervention in a clinical field can be defined as a condition of psychological

difficulty or distress related to a moment of transition or crisis. In this sense, we think of a diagnosis of illness, a sudden loss or a particularly abrupt professional or family change. These events do not necessarily lead to a state of distress, but they can certainly be defined as potentially critical, as they can challenge the meanings that a person has constructed around themselves and the relationships between them and their environment. Therefore, this type of intervention is suitable for people who are experiencing a crisis, regardless of their mental functioning (e.g., severity of pathology, degree of ego strength, degree of mentalization, etc.).

In our opinion, a psychological intervention aimed at supporting coping with these events can have the following objectives:

(a) promoting the understanding of the critical event and the changes involved;
(b) imagining what role that the critical event has played or can play in one's own life history;
(c) mobilizing the person's individual and social resources;
(d) supporting decision-making and autonomy in the face of situations of deadlock or persistent indecision;
(e) facilitating the expression and understanding of emotions related to the event.

To achieve these goals – which do not involve the treatment of psychopathologies or conditions of distress structurally connected to the client's personality – the psychologist can use narrative as a clinical tool that can activate a movement *from sense to meaning*. In other words, the narrative discourse that is co-constructed within the clinical relationship should support the construction of increasingly complex and articulated representations of oneself and one's relationship to the critical event.

From this perspective, it seems possible to think that if the guiding question for the psychologist in a psychotherapeutic intervention to construct the trajectory of the intervention is "What gives rise to the condition of distress that affects this person, and how do the experiences he/she has gone through in his/her life influence who he/she is now?" (a question that can be framed differently depending on the theoretical reference model), the question that guides the support intervention is "How can this person cope with this critical experience, regaining a sense of mastery over his/herself and his/her life contexts?".

Creating a clinical device that promotes the improvement of narrative functions means ensuring that the person's self-narrative and the narrative of the event become increasingly complex and capable of integrating positive and negative aspects of the experience. The psychologist thus contributes to the construction of the client's narrative, not with the aim of promoting deep discovery and self-restructuring, but with the aim of supporting the articulation of narrative functions towards increasingly complex and differentiated modalities.

The narrative functions we described in the previous paragraph are always present in a narration but can be rigid and depowered. For example, the expression of emotions in a narrative may be vague, or individuals may have difficulty distinguishing between similar emotions or connecting their emotional experiences to specific events or contexts. Similarly, the meaning attributed to a critical event may be rigid, have no connection to other significant aspects of one's life, or be denied, as if the critical nature of the experience cannot be acknowledged. Psychological support intervention can support the development of these functions, for example, by helping individuals to recognize the different emotional nuances associated with the same situation, to recognize their responsibility for the experiences that affect them, to acknowledge the pain and suffering associated with a critical event without experiencing the annihilation that hinders the mobilization of their resources.

Ultimately, we believe that the narrative device in an intervention to support the management of critical situations aims to transform the sense of the experience, understood as the affective and non-symbolizable context underlying that experience, into a representable and shareable meaning, as complex and differentiated as possible, capable of guiding the person's choices and restoring an effective sense of mastery.

Conclusion

This paper was written with the aim of contributing to the current scientific debate on the definition of the typical acts of psychologists and psychotherapists. Starting from a narrative perspective, we have

tried to formulate the typical support act of a psychologist working in the clinical field and to distinguish it from a psychotherapeutic act in light of the diverse psychological health needs and the different intervention objectives.

Along this line, we believe that what distinguishes the typical act of psychological support from the typical act of psychotherapy is a methodological criterion that takes shape in the direction of psychological work: on the one hand, the psychological work in supportive intervention moves in the same direction as the psychic functions, articulating contexts and devices useful to express those functions toward their development; on the other hand, the psychological work in psychotherapy moves in the opposite direction, identifying and restructuring the basic structures (cognitive, affective, or relational) that feed the functions, regardless of theoretical models. In other words, we could define support intervention as a process in which the clinical relationship serves as *scaffolding* for psychic functions in the direction of their development and integration. Indeed, supportive interventions seem appropriate both in conditions where the severity of mental functioning does not allow for psychotherapeutic intervention (in which case we could imagine that a support intervention could precede or accompany psychotherapeutic work) and in critical conditions where a disorganization or dysfunction of the mental system can be hypothesized.

Finally, we believe that the use of narrative as a psychological tool in the clinical relationship and its delineation based on the specificities of the clinical contexts in which psychologists work can provide useful tools for the conceptualization of professional practices that characterize the work of psychologists in different intervention contexts (healthcare, education, correctional, etc.). These contexts offer psychologists the opportunity to structure supportive interventions that may be methodologically based on narrative, depending on the nature of the clientele, the settings used and the social and institutional mandates that characterize them.

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