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**Vlad: an emotion generator and recognizer based on image  
manipulation**

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*Live and learn from fools and from sages*

*You know it's true*

*All the things come back to you*

*(Aerosmiths, Dream On, 1973)*

## Table of Contents

Chapter One. Representations, Perceptions, and Virtual Reality. The roots.....	9
1.1 Mental images, representations, and emotions .....	9
1.2 Scotomization of mental images.....	15
1.3 Virtual Reality in treatment and rehabilitation .....	17
1.4 The French psycho-somatic school's approach.....	18
1.5 The Suppression Mental Questionnaire.....	23
1.6 The Propp's folktale morphology and the games .....	29
1.7 Image manipulation: a way to induct and identify emotions.....	33
Chapter Two. Generating and Recognizing emotions: the Vlad game. The trunk. ....	35
2.1. Declination of Propp's folktale morphology in Vlad. .....	35
2.2. Vlad General Architecture.....	37
2.2.1 General Finite State Machine .....	38
2.2.2 Adapted Finite State Machine. ....	40
2.2.3 Vlad Hardware and Software Components .....	41
2.2.4 Software Operational Environment .....	42
2.3. Hardware for Vlad Usage .....	43
2.3.1 Visualization Hardware .....	43
2.3.2 Interaction Hardware .....	47
2.3.3 Selected hardware for Vlad v.1.0.0.....	51
2.4. Architecture of Vlad Application .....	51
2.4.1 Init.....	52
2.4.2 Main screen and the selection of the Hero.....	52
2.4.3 Other characters .....	53
2.4.4 The 21 Propp's functions.....	54
2.4.5 Game Playing.....	60
2.4.6 Metrics and Performance indicators .....	60
2.4.7 Performance Recording .....	61
2.4.8 Data archiving.....	62
2.4.9 Software GDPR compliance.....	62
2.5. Implementation tools .....	62
2.6. Emotion Recognition Algorithm .....	63

2.7. Vlad Application development .....	65
<b>Chapter Three. Clinical trials and validation. The leaves...</b>	<b>75</b>
3.1 Goals of validation.....	75
3.1.1 Rationale for Goals of Validation.....	75
3.1.2 General methodologies and validation issues .....	79
3.2 Validation scenarios.....	83
3.3 Criteria of selection of sample for validation .....	88
3.4 Design of the Clinical Trial .....	91
3.4.1 Protocol.....	92
3.5 Design of the Software Validation.....	95
3.5.1 Protocol.....	96
3.5.2 Sars-CoV-2-related issues .....	98
3.6 Combined Protocol .....	99
3.7 Results .....	100
<b>Chapter Four. Conclusions.....</b>	<b>111</b>
4.1 Results analysis and Conclusions .....	111
<b>Bibliography.....</b>	<b>116</b>
Annex 1. Propp's folktale morphology on Vlad scenarios mapping table.....	137
Annex 2. Function mapping table for Game Levels.....	151
Annex 3. Assessment. DSQ-40.....	153
Annex 4. Assessment. Common Defense styles.....	154
Annex 5. Assessment. DCPR.....	155
Annex 6. Assessment. TAS-20.....	168
Annex 7. Assessment. SMQ. ....	169
Annex 8. Assessment. ER89-Revisited Italian/English....	170
Annex 9. Computer Literacy Questionnaire (Italian) .....	171
Annex 10. Computer Literacy Questionnaire (English)...	174
Annex 11. Patient's requirements questionnaire (Italian)	176
Annex 12. Patient's requirements questionnaire (English)	178
Annex 13. Likeability Questionnaire (Italian).....	180
Annex 14. Likeability Questionnaire (English).....	182

Annex 15. Validation Instruments .....	184
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## Index of Figures

Figure 1 - "Tree representation" of the VR-based Image Phenomenology research.....	16
Figure 2 - The Suppression Mental Questionnaire mobile App logo .....	26
Figure 3 - The SMQ App start activity.....	27
Figure 4 - SMQ App results summary.....	28
Figure 5 - The Vlad serious game Game Board. ....	36
Figure 6 - An example of State Diagram.....	38
Figure 7 - The full Deterministic Finite State Machine for Vlad.....	39
Figure 8 - The Adapted DFSM for Vlad.....	41
Figure 9 - The 3D Game Space.....	43
Figure 10 - The OSVR HDK2 VR headset by RAZR.....	44
Figure 11 - The Oculus Quest HMD and its controllers....	46
Figure 12 - HTC Vive Controllers description. ....	49
Figure 13 - An example of VR Glove (property Manus). ..	50
Figure 14 - Standard Card model for Vlad. ....	55
Figure 15 - The Title and Control Bar in the Game Board.	56
Figure 16 - The Characters' Panel.....	57
Figure 17 - The King character.....	57
Figure 18 - The Queen character. ....	58
Figure 19 - The Settings Panel.....	58
Figure 20 - The Action-Card Panel.....	59
Figure 21 - The Game Board Panel. ....	59
Figure 22 - The Monitoring Panel. ....	60
Figure 23 - The selection of game level from the patient's PoV. ....	67

Figure 24 - The parameter setting screen before the start of the game.....	68
Figure 25 - The “Play game” click.....	69
Figure 26 - The main settings screen.....	70
Figure 27 - The hero in dark red and brown clothes, setting done.....	71
Figure 28 - The hero in grey and green clothes, ongoing setting.....	72
Figure 29 - Colour palette and completion of hero configuration.....	72
Figure 30 - The VR game-board.....	73
Figure 31 - Vlad Test, helper selection.....	73
Figure 32 - Vlad test, wizard selection.....	74
Figure 33 - Vlad test results.....	74
Figure 34 - Likeability Questionnaire item trends for User #1.....	108
Figure 35 - Likeability Questionnaire item trends for User #2.....	109
Figure 36 - Patient's Requirements Questionnaire item trends for User #1.....	110
Figure 37 - Patient's Requirements Questionnaire item trends for User #2.....	110

## Index of Tables

Table 1 - Likeability questionnaire results for User #1....	103
Table 2 - Likeability questionnaire results for User #2....	104
Table 3 - Patient's Requirements questionnaire results for User #1.....	105
Table 4 - Patient's Requirements questionnaire results for User #2.....	106
Table 5 - Mapping of Propp's morphology on Vlad scenarios. ....	137
Table 6 - Vlad functions on game levels mapping table. .	151
Table 7 - DSQ-40 Questionnaire, Italian version. ....	153
Table 8 - Common Defense Styles. ....	154
Table 9 - Anxiety, Nosophobia, Thanatophobia criteria in DCPR.....	155
Table 10 - Disease Denial and Somatization criteria in DCPR.....	156
Table 11 - Conversion Symptoms and Anniversary Reactions criteria in DCPR. ....	157
Table 12 - A-type Behaviour and Irritable Mood criteria in DCPR.....	158
Table 13 - Demoralization and Alexithymia criteria in DCPR.....	159
Table 14 - DCPR Interview, Italian version. ....	160
Table 15 - TAS-20 Interview, Italian version.....	168
Table 16 - Suppression Mental Questionnaire, Italian version. ....	169
Table 17 - ER89-Revisited, Italian and English items. ....	170

# Chapter One.

## Representations, Perceptions, and Virtual Reality.

### The roots.

#### 1.1 Mental images, representations, and emotions

From the phenomenological point of view we see an important difference between perceptual and representational phenomena. Therefore, this difference will deepen when passing from perception to representation and in the role they both have in the psyche. The different approaches, which are based on the interpretative pathways of phenomenology, indeed deepen the complexity that governs functioning in its typical and abnormal manifestations.

Mental images have been considered relevant to psychopathology for their relationships with emotions (Holmes and Mathews, 2005).

In this regard, images can evoke emotions in at least three ways:

- Through a direct influence on the emotional systems of the CNS, sensitive to sensory signals and therefore in a perceptive order
- Through the overlap between the processes involved in mental imaging and the perception which can lead to responding from the "*as if*" perspective to actual emotional events triggered by them
- The ability of images to come into contact with memory traces due to emotional factors linked to past episodes and thus becoming representations subject to unconscious dynamics

Whatever their origin may be, the images seem to be characterized by their subjective resemblance to sensory impressions, such as to arouse metaphors such as "*seeing with the eye of the mind*" or "*hearing with the ear of the mind*" (Kosslyn, Ganis, and Thompson, 2001, p. 635). This should not be considered in the sense that images can exclusively be considered as perceptions, but rather that they are neural representations.

The potential of the images and the results of their activity, in fact, transversally manifest in several mental disorders. The phenomenon called Imagery is the hallmark of post-traumatic stress disorder: emotions can be evoked by images in the form of "*flashbacks*" of the original traumatic event.

This also occurs with drug addiction, where the image of the desired drug induces abnormal alterations and manifestations of emotional circuits (Kavanagh, Andrade, and May 2005). The actions of the images concern correlations that are often explicitly reported by those emotional disorders such as post-traumatic disorder or social phobia, as reported by Hackmann and Holmes (2004), Hirsch and Holmes (2007) and Holmes, Arntz, and Smucker (2007).

These images are widely reworked in the onset or maintenance of these disorders (Ehlers and Clark, 2000). As an example, in therapeutic terms, it has been proposed that for the purpose of avoiding anxiety associated with images and possible adverse outcomes, thinking of them verbally is a contributory factor of pathological concern (Borkovec, Lyonfields, Wiser, Deihl, 1993). The avoidance of images with a high emotional correlation can also occur in a

depressive form with rumination, which likewise has a verbal representative nature (Fresco, Frankel, Mennin, Turk, and Heimberg, 2002).

Consistently with the belief in the emotional power of images, therapists using a wide range of approaches have incorporated the manipulation of mental images related to emotional concerns during treatment.

The idea that images may have special connections with areas of emotion is not new, and is central to the Bio-Informational-Emotional-Imaginary theory proposed by Lang (1979). In this perspective, images are supposed to be particularly effective in provoking emotions when images include "*response propositions*", that is, in regards to the adaptive or maladaptive response they produce.

Although this evidence is therefore not yet fully elucidated from a neuropsychological point of view, it seems plausible that emotional systems could be particularly sensitive to imaginative quotas given that proto-emotions, such as fear, have evolved relatively early in our evolutionary history, to facilitate response to sensory events of danger (or pleasure).

In this regard, the sensory signals are able to elicit rapid responses through brain areas implicated in emotions, such as the amygdala (archicortex), bypassing the need for higher level processing by other neocortical areas (LeDoux, 2000).

Based on this and other evidence showing that emotional responses can be induced by stimuli which are presented out of awareness, Öhman and Mineka (2001) argued that the emotionality of responses such as fear derive from modular systems which are relatively isolated from the influence of

higher-level conscious processes, such as those involving speech. The possibility therefore remains that some emotional systems have evolved before the development of speech, so that one can memorize and respond mainly to information in a sensory form and can be less sensitive to information represented in a more abstract and symbolically arbitrary way, like speech.

The role that images play in terms of evocation of memory is also central. Brewer (1996) finds that subjects report mainly through images, in the most forms of memory. Images are almost universal when the subjects are induced to remember recent and distant events. Conway and Holmes (2005) argue that intrusive images in psychological disorders can be a form of difficulty in managing autobiographical memory. Stopa (2009) has further developed this concept in psychopathology in terms of images and of "*threatened self*". In their theory of autobiographical memory, Conway and Pleydell Pearce (2000) state that confabulation anomalies and other abnormal memory forms can prove that the personal memory of processes cannot be explained in terms of direct access to a true and complete recording of events. Rather, it would be linked to control processes, appointed to assemble autobiographical memories from fragments located within a general basic knowledge. The same processes involved in the regeneration of memories of past events could be used to generate new mental images, (Schacter, Addis, and Buckner, 2007).

The implications of the surprising parallel between the cognitive operations necessary to remember the past and to

imagine the future have been widely discussed by Schacter, Addis, and Buckner (2007), who argue that both are mediated by a common "*basic brain system*". Neuro-imaging studies directly comparing memory activities and imagination of personal events revealed that both activate the medial prefrontal and temporal regions, together with posterior activation in areas such as the visual cortex (Addis, Wong and Schacter, 2007; Szpunar, Watson, and McDermott, 2007). There are also some differences in activation between remembering the past and imagining the future. For example, there is greater early activation in the frontal areas when future events are imagined than when remembering past events (Okuda et al., 2003).

While most studies on autobiographical memory do not seem to focus on emotions, it is necessary to deepen the common core of the systems. This suggests the hypothesis that such studies do not exhaust the power of images and provide an explanation on why mental representations can be particularly susceptible when evoking emotions.

It is necessary to analyse in depth the possibilities that images not only underlie the symptomatology and subjective phenomenology, but that they can also act as guarantors. The power of the images, in fact, conveyed through reactions to particular clinical situations, provides us with products that can be analysed through refined methods with a long tradition.

The vehicle deepening the subjective psychopathological experience is the image, considered in these terms and by its nature, as a form of consciousness (Sartre, 1940), since

physical phenomena are experienced by the subject and perceived through the five senses become psychic phenomena and representations, belonging to the subject's consciousness (Husserl, 1911).

Thus, through phenomenological psychology, image and conscience can express their inextricable co-belonging (Sartre, 1948). Phenomenology, which has the task of making the moods of the person present and evident (Jaspers, 1912, p. 391), distinguishes representation from perception (Jaspers, 1913-1959). Through the psychoanalytic point of view it becomes possible to consider it as a *representation of thing*, to which the *representation of word* is tightly bound, both endowed with *affective charge*. Therefore, affective representation translates in terms of feeling, processes and modifications of perceptive nature (Freud, 1891).

In terms of clinical and hermeneutical analysis, projective methods are therefore instruments or stimuli whose purpose is to elicit verbal or graphic products, which are expressions of the subject's mental activity (Settineri et al, 2014).

The need to adhere to this method expresses a perspective that must therefore be *methodological*, to the extent that through the method, the misunderstanding would be reduced and it would be possible to acquire the fact (Jaspers, 1913-1959). This need is concretized through clinical contact and is conveyed and also catalysed through the Rorschach method (Rorschach, 1921), and dream analysis, which allow us to develop and order the knowledge on the thread of the methods with which we acquire and therefore know the knowledge and thereby clarify things (Jaspers, 1957).

For those dealing with psychotherapy, the approach to images may suggest a further form of understanding the subject's behaviour, with respect to the direction and origin phenomenology suggests that even in cases where the lived experience seems to be the explicit etiopathogenesis of overall effects, understandable roots sink into the past, far beyond the event.

Mental energy, when spent in the production of gestures representing subjective qualities, can rightly be considered a possibility of an emergence of content, whose expressive purpose is part of the scientific intent to know and classify phenomena.

In a particular way, from a neuropsychological point of view, the affective expenditure aimed at the response and the gesture can be understood from the perspective of mentalization, or rather of the process combining the deep and ancestral properties of the archicortex, with the most recent cortical prerogatives, respectively combining an emotional potential with adaptive aim and neocortical potentialities, whose purpose is elaborative (Settineri, 2015).

## 1.2 Scotomization of mental images

*Scotomization* is a psychological term for the mental blocking of unwanted perceptions (used in analogy with the visual blindness of an actual *scotoma*).

The idea underlying this work is that scotomization leads to illness, more precisely to psychosomatic phenomena. A confirmation of this hypothesis will be provided in cognitive

issues. What happens when the blocked (or suppressed) contents go back to consciousness will also be discussed.

For this aim, the research activities presented in this work can be represented in the form of a tree where:

- The roots are the perceptions, their analysis and identification of the repressed contents and of the corresponding psycho-somatic phenomena.
- The trunk represents the restitution of those contents and representations to consciousness through therapeutic practice based on Image Phenomenology.
- The leaves could be considered as the manifestation of positive effects of imagination processes carried out through Virtual Reality practice and rehabilitation as it will be discussed in the next section.

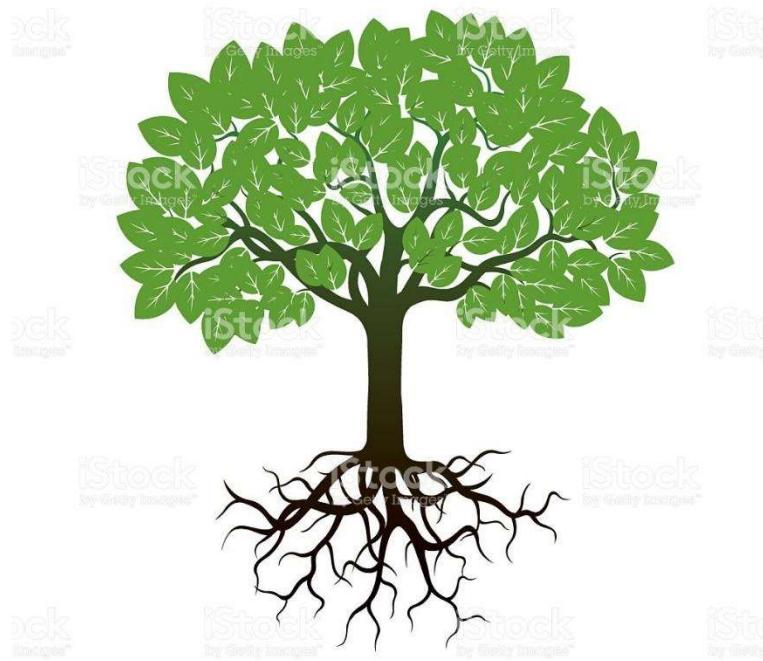


Figure 1 - "Tree representation" of the VR-based Image Phenomenology research.

### 1.3 Virtual Reality in treatment and rehabilitation

This study speculates and aims to demonstrate that an interruption of the flux between cognition and representation can be treated by Virtual Reality (VR), representing a cross technology which can be applied to several pathologies. VR enables investigation of the relationship between representations and cognition and treats all phenomena which interrupt it, e.g. defences in psycho-somatic phenomena, through the implementation of *mentalization* that is the skill to bring the contents from archicortex to neocortex.

The practice of virtual reality in treatment of psychopathology such as psychosis is well-known in literature (Valmaggia, 2017) and our intent is to extend this aim to cross-examine phenomena to make clinical practice easier and even to make the use of virtual reality in an accessible manner possible.

This intent could even be related to the concept of validity of classical methods such as an extension of the psycho-diagnosys (Parsons, et al., 2015).

As suggested by Valmaggia, this use of virtual reality has been extended to several mental disorders and mental health problems (Valmaggia, 2016).

In these types of studies, participants enter a virtual environment, like public transport or a café, populated by avatars who show behaviours which can be interpreted as ambiguous, for example looking at the participant and

looking away. The occurrence of paranoid ideation or hallucinations triggered during the virtual reality experience is then assessed.

#### 1.4 The French psycho-somatic school's approach

Clinical psychology is the field including competences related to clinical and relational fields, both in terms of study methods and intervention in the different operational models. These models, which can refer to the individual, to relationality, to family and groups, characterize possible applications of psychology in different areas.

The psychological intervention related to people, groups, and systems refers to the resolution of their problems in the health field, in psychological distress and in the psychological aspects of psychopathologies.

In this regard, psychosomatic, drug abuse and sexual pathologies are included. The skills extended to psychophysiology and clinical neuropsychology are therefore fundamental, also aimed at understanding and solving problems through evaluation, prevention, psychological rehabilitation and psychotherapy interventions.

The multidisciplinary approach of clinical psychology responds to the needs and uses of knowledge in the fields of mental functioning, typical or abnormal. The key to understanding the phenomena lies in the dimensionality of psychic manifestations and in their quality.

It is therefore a question of phenomena, whether they are observed in terms of descriptive or interpretative models. These models therefore allow us to gain knowledge respectively from the inter-subjective presence of the phenomenon and from the transversal manifestations, as well as from subjectivity aspects difficult to reduce.

In fact, the complexity of the psychic functioning and manifestations lie in the inter-feedback processes the mind guarantees. With this, we want to clarify that the desirable linearity for deterministic approaches of hard science is difficult to reconcile with the variability and emergencies of the psychic. In this regard, as a phenomenon continuously varying and evolving, the mind can be considered as an emergency, very different from the simple summation of its parts. The psychological purpose in the clinical setting has its fundamentals on the study of phenomena, aimed at order and knowledge creation, in line with evolutionary, comprehensive and complex trends.

Any application requires personal contact and relationships, to the extent that the etymology of the clinical term borrows its origins from the Greek sense, leaving aside the univocal concept of hospitalization and declining to the extended sense of relationships. This approach needs to be supported by the knowledge of psychic functioning starting from its first evolutions up to the reality of conclusion of existence, of psychopathology, through which the operation of the therapeutic intervention is outlined.

A model of psychic functioning proposed in the following, considered adequate for the purposes of this work, allows us to understand the basic relationships between older brain structures (be they archicortex) and modern ones (neocortex), whose respective manifestations need to be understood in a complex view.

It becomes necessary to understand that to the extent the substance manifests itself through the relationships, those ones intervene on the substance plastically modifying it.

This retroactive view is adopted in order to study the manifestations that do not exclude substance. They can be coupled to the study of the substance which does not exclude its manifestations.

The key to interpretation lies in training, as e.g. for those who have chosen to dedicate to the mind starting from the “logia” without excluding the “atria” and vice versa. From the several points of view, as well as from teamwork and multidisciplinary considerations, comes the cultural warmth necessary to implement literature, the state of the art and our knowledge.

There are two main levels:

- Affectivity
- Representations

Regarding affectivity, even intended as an emotional nucleus, the origin is certainly older. In this regard, it is related to the naming of archicortex, or rather of those subcortical structures that, common to other species, regulate survival.

From an evolutionary point of view, older structures, aimed at the intrinsic and extrinsic adaptation of the individual, common and ancient. The parts at stake are emotions, which are absolutely biological, but which, as proposed, consist of manifestations and are aroused and influenced to an adaptive purpose.

Their phenomenology is polar, therefore understandable in positive and negative terms, as it is possible to deduce through introspection also. The abnormal and maladaptive manifestation lays in the defect and in the excess, as for depression, in which we find anhedonia. Thus, mental energy production is located in central and ancient structures. We treat a production that has its own metric, its own quantity and quality.

For example, from the prevalence of energy destination (inward or outward), we understand the dynamics of introversion and extroversion, as well as the affective dynamics that have governed the origin of dynamic psychology: aggression and libido. The common origin of the substance in fact gives place, in transversal terms to species, to fundamental manifestations for species survival and progression. The issue becomes complex to the extent that these manifestations evolve and face a diversified and likewise complex environment, such as human society.

Affectivity requires ways of expression, which pass through higher ways, such as representations and somatic ways. The latter indicate that the destination of mental energy can be physical, as it happens in psychopathological terms for

psychosomatic pathologies or more common phenomena such as restlessness, a feeling without an object that unlike anxiety has a component of somatic agitation.

It is important to understand that energetic quantities require continuity and conservation. This means that in the impossibility to discharge the energy towards a specific goal, it can move towards another one or other ones.

The components interact dialogically, through a "dialogue", without the pathology showing. When we previously discussed the dialogic interactions (inter-feedback), we wanted to clarify that psychic functioning is built from the dialogue between parties and their continuous retroactive exchange.

On a higher level we find representations, the anti-thesis of perception, both being of the mind and different from the sensitive ways. We therefore distinguish *representations of things* (images) and *words* (of a linguistic matrix), although we do not exclude other types of representations serving as representational procession, accompanying the former ones. The role of representations is high, as is their expression, e.g., through artistic means. The origin of the *representations of what* is more ancient, as the rupestrian paintings (from 40,000 years ago) with respect to the language (about 10,000 years ago). The role of image in mental functioning is fundamental, as it is also in clinical terms, whether they are considered as a means of knowledge. Their direct knowing is as complex as their nature and evolution, so that clinically this process of knowledge can be accelerated through methods. This

happens as an example through the interpretation of the Dream and the Rorschach reagent. Although these methods need more space and are related to higher education, the need expressed by this teaching aid is to produce an understanding from the earliest university experiences, related to clinical psychology. The relationship in fact passes through different paths, whether they are based on different models or on factors and human manifestations like images. The antiquity and the actuality of the image in fact, represents a method of study of mental functioning, which compared to the previously proposed schemes allows to deduce the nature of the images, the destination of affectivity and the typical features of subjective functioning.

Image requires hermeneutics, and since this process is absolutely necessary and complex, the effort, the culture and the dedication necessary are high goals. The French school, identifiable with P. Marty, considers these facts as treatable through a process that brings facts back to the conscience.

## 1.5 The Suppression Mental Questionnaire

In this section a clarifying clinical trial example, focused on treating, will show how to discover a typical fault of representations related to mental images, which are not able to go back to consciousness.

Previous experiences on the study of repression (Settineri et al., 2016) highlighted the possibility of quantitative defence study, through the questionnaire (SMQ, 2016). The emergence of three factors, respectively a repressive

function, a regression in the service of the ego and rationalization, brings back the opportunity to deepen the defensive dynamic, not as an exclusive totality, but in detail. As suggested by Berney et al. (2014), the clinical study of defences provides a means to understand the affective dynamics occurring in all individuals. This is a practice particularly useful both in clinical work, research and psychotherapy. Metzger (2014) underlines the adaptive meaning of repression: in this regard, it is included among the defences that are mature even at the testological level (Perry & Henry, 2004); the metaphor of Vaillant (2000) bears witness to this: "When used effectively [...] suppression is analogous to a well-trimmed sail (p.94)". In detail, the defensive state of repression is expressed where the need to deal with conflicts is consciously recognized. Unlike most psychoanalytic concepts, repression is part of our daily life as an immediate datum of consciousness, everybody is familiar with (De Burge, 2001). The particular commitment of this study focuses on the clarification made starting from S. Freud (1926, 2013) which differs the repressive destination (*Unterdrückung*) of representation, from the removal of the affection linked to it, deepened in detail by A. Freud (1936/1937) which refers to the consideration of repression as a conscious phenomenon distinct from repression.

Like any consideration referring to a dimensional approach, even repression as a psychic phenomenon is not exempt from the production of psychopathological outcomes.

In fact, where the emotional state is not fused with representation and therefore symbolization is not allowed and

it has to be seen as a defence against intolerable emotions and fantasies (Busch, 2014), we witness the somatization phenomena. This is an expression of psychological and emotional distress through the body (De Burge, 2001), such as responding to the economic phenomenology of mental energy destination.

This psychosomatic aspect on the basis of psychoanalytic studies concerning current neuroses is provided by the clinical practice of Marty & Fain (1952), where the authors later clarify that the failure of psychic elaboration of excitement would produce a drift of the excitement itself. It would not admit the immediate extinction, but rather an organ destination (1955) which, as proposed by Dechaud-Ferbus (2009) in the studies of Green (1993), is called "pathologies of the negative" due to the fact that they are linked to loss and destructiveness.

As stated in the previous study, which states the possibility of using the metric approach aimed at detecting and studying the dynamics of mental images and their affectivity, the current study extends the proposal to the current IT prerogatives.

As previously stated, authors postulate that the difference between suppression and repression, highlighted in particular by the Société Psychanalitique de Paris, allows the development of a quantitative instrument. Since suppression is a conscious defence, it results also quantifiable through the use of scales and questionnaires. This psychological account is in order to build a questionnaire that includes the

identification of eighteen items somehow having a plausible relationship with this defence mechanism. The exploratory factor analysis identified three factors, named respectively “repressive function,” “regression in the service of the ego” and “rationalization,” the first of which is the closest to the theoretical construct postulated.

For this reason, a “Suppression Mental Questionnaire” mobile Application (SMQ App) was created, offering a Digitalized Suppression Mental Questionnaire, which is quick and easy to use. This App, available for Android OS (version +4.4), is distributed through the Google Play store. The following figure shows the SMQ App logo.

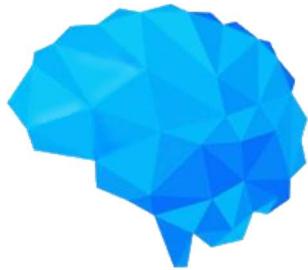


Figure 2 - The Suppression Mental Questionnaire mobile App logo.

The App lays on the power of *Web Services* to transfer information to an administration platform. Web services are client and server applications that communicate over the World Wide Web's (WWW) HyperText Transfer Protocol (HTTP). As described by the World Wide Web Consortium (W3C), web services provide a standard means of interoperating between software applications running on a variety of platforms and frameworks. Web services are characterized by their great interoperability and extensibility, as well as their machine-processable descriptions, thanks to the use of XML. Web services can be combined in a loosely

coupled way to achieve complex operations. Programs providing simple services can interact with each other to deliver sophisticated added-value services. So, the administration platform is able to collect anonymous data from users for further mining and analysis. Data can be grouped in campaigns by adoptions of unique campaign identifiers. The administrator, through the SMQ Portal, can inspect data and/or download them for further analysis.

The portal is also able to transparently call SPSS features to provide statistical analysis thanks to a deep analysis and smart scraping activity. SPSS Statistics is an IBM software package used for interactive, or batched, statistical analysis.

The same can be done for AMOS software for the confirmatory factor analysis.

Here follow the start activity and the main screen of the App.



Figure 3 - The SMQ App start activity.



Figure 4 - SMQ App results summary.

The adoption of digital tools speeds up clinical investigations on suppression mechanisms and makes clinical trials easier by reducing the needed effort for manual scoring. It also enables faster and deeper research practices, also more appropriate to the times by enabling the real-time transfer of the results to digital archives in order to foster further computation and analysis for statistical and psychometric purposes. Mobile operating systems, Internet and Web 2.0, and the considerable computing capabilities provided by Clouds are an extremely powerful combination of tools able to provide Open Data/Results in real-time manner to scientists and users as well, and to spread the use of the questionnaire all over the world.

The Suppression Mental Questionnaire system (the mobile App, the Web Services, the Cloud, etc) acts as a bridge

between the dynamic psychology, the cognitive studies, and modern information and telecommunication technologies.

### 1.6 The Propp's folktale morphology and the games

Since its introduction (1950), Propp's model of the structure of fairy tales has been regarded as one of the milestones in semiotic analysis and narratology (Ardvisson, 2006), becoming a pillar for game studies, making someone claim for a universal, beyond Russian fairy tales, applicability of Propp's pattern (Berger, 2002).

While studying Propp's context, scholars in 19th century had proposed the folk tale was an ancient all-European genre and, by deducing the historical spread of each tale within Europe, tried to deduce the place of origin of the genre proper (Aarne, 1910; Thompson, 1928, 1961).

As Thompson states (1961), even a universal applicability could be excluded due to different traditions of nations like American and Central African Indians, a general application on Europe and West-Asia can be considered.

Propp's model, based on an analysis of 100 texts in Afansiev's collection of Russian Folktales representing the subcategory of fairy tales (Propp, 1968), can be seen as a common pattern for all folk tales, also including all forms of narratives in non-European and all ancient societies, being a model for fairytales which can be used in comparative studies. The Propp's model can be regarded as an archetypical structure for all narratives in the considered areas.

The Propp's model consists of 31 consecutive functions. Every one of them functions in the tale as an isolated element concurring to the narrative as a whole, and an inventory of dramatis personae. Citing Holbek (1986) the functions are:

1. *Absentation. One of the members of a family is absent from home.*
2. *Interdiction. An interdiction is addressed to the hero.*
3. *Violation. The interdiction is violated.*
4. *Reconnaissance. The villain makes an attempt at reconnaissance.*
5. *Delivery. The villain receives information about their victim.*
6. *Trickery. The villain attempts to deceive their victim.*
7. *Complicity. The victim submits to deception.*
8. *Villainy The villain causes harm to a member of a family,  
alt. 8a: Lack. One member of a family lacks something.*
9. *Mediation. Misfortune or lack is made known.*
10. *Beginning counteraction. The seeker agrees to counteraction.*
11. *Departure. The hero leaves home.*
12. *First function of donor. The hero is tested, which prepares the way for receiving a magical agent or a helper.*
13. *The hero's reaction. The hero reacts to the actions of the future donor.*

14. *Provision or receipt of a magical agent. The hero acquires the use of a magical agent.*
15. *Spatial transference, guidance. The hero is transferred to the whereabouts of an object to be searched for.*
16. *Struggle. The hero and the villain join in direct combat.*
17. *Branding, marking. The hero is branded.*
18. *Victory. The villain is defeated.*
19. *Restoration/ Lack liquidated. The initial misfortune or lack is liquidated.*
20. *Return. The hero returns.*
21. *Pursuit, chase. The hero is pursued.*
22. *Rescue. Rescuing the hero from pursuit.*
23. *Unrecognized arrival. The hero, unrecognized, arrives home or in another country.*
24. *Unfounded claims. A false hero presents unfounded claims.*
25. *Difficult task. A difficult task is proposed to the hero.*
26. *Solution. The task is resolved.*
27. *Recognition. The hero is recognized.*
28. *Exposure. The false hero or villain is exposed.*
29. *Transfiguration. The hero is given a new appearance.*
30. *Punishment. The villain is punished.*
31. *Wedding. The hero is married and ascends the throne.*

The list above was then reduced to 20 (Greimas, 1983) and this is the version which some Italians, like Alberto Moravia, authors refer to during the 20th century.

Even the significance of Propp's model hasn't been tested in any larger extent comprising a variety of folk tales, it is universally recognized as the reference pattern for fairy tales (Holbek, 1986) also when considering (Meletinskij et al., 1974) the reduction of the 31 functions into five moves (the ones changing the status of hero/heroine) and eight possible social positions, constructed by the combination of the oppositions (high-low, male-female, young-adult).

This framework allows to make a story flow that becomes easier when starting at the end of the narrative, where the outcomes of all events are pinned down, and tracing them backwards (Ardvissón, 2006).

What Holbek's model suggests is a generative grammar for tales of magic, that is, the similarities of many European folk tales and the variation within the genre is to be explained as a common, stereotyped pattern for remembering stories as well as producing new ones, a narrative/entertaining competence of the skilled narrator (it shall be remembered that the telling of tales of magic was a specialist craft, not common everyday knowledge).

In other words, the European folktale/tale of magic gets its narrative force from the oppositions of male and female, young and adult, king and peasant (rich and poor) being topics of interest.

This framework can be considered an interesting starting point for the research we depict to be implemented through Virtual Reality and enabling objects manipulation.

### 1.7 Image manipulation: a way to induct and identify emotions.

As reported in the previous sections, scotomization leads to illness, more precisely to psychosomatic disorders. A confirmation of this hypothesis will be provided in terms of cognition.

Since representations and mental images are outcomes of internalization of fantasy-object or products, they are not directly accessible to consciousness so that the knowledge of them can be obtained only through their own products. More than in the normal status, in pathological statuses, the possibility that representations emerge is denied and disturbed.

Our intent is to extend the outcomes of a / the classical psycho-therapeutic approach to new issues of Virtual Reality.

In fact, the clinical and therapeutic practices could represent a way to increase this possibility, in our case, through the manipulation of images in 2-dimensional or 3-dimensional environments. This kind of approach aims to improve the generation of those products such as the variation of representations and the related emotional aspects.

In my previous professional experience it has been recognised for neuro-degenerative diseases through the same

technologies and software design and development practices. This is demonstrated also by the rise of several companies operating in the field whose products are day-by-day entering the rehabilitation and training centres all over the world (Rus-Calafell, et al., 2014; Freeman, et al., 2016; Pot-Kolder, et al., 2016).

Activities could be considered as deriving from some initial hypothesis, like having, through the enabled perspective, the chance to:

- Detect the presence of images related to specific fields of content playing a special role within certain psychosomatic pathologies;
- Collect data referring to the way these contents evolve and what they are composed of;
- State that scotomization leads to pathologies and that they can be detected, in conjunction with others, through the proposed method for psychosomatic subjects.

## Chapter Two.

### Generating and Recognizing emotions: the Vlad game. The trunk.

#### 2.1. Declination of Propp's folktale morphology in Vlad.

The Vlad software has an intuitive user-friendly operation by design, so as to help the player to move inside a three-dimensional semi-immersive space. Vlad is an emotion generator and recognizer operating through image manipulation and qualitative and quantitative monitoring & recording of storytelling experiences. This is obtained by fostering the storytelling process through the usage of images in an engaging and amazing context, which is simultaneously simplified and partially automated.

The heart of the Vlad serious game is composed by two modules working together to build a completely new experience to structure the self. In the Vlad software, it is done through the implementation and the deployment in a 3D space of a game using a 21-function-cards version of the Propp's folktale morphology. The two modules we mentioned namely are:

- The “Game Board” (in Italian language, “Tabellone di Gioco”), contained in the “Game Board” 3D scene within the RunFunction scenario and shown in the above Figure, where the sequence of functions implementing the morphology takes place and where the player (the user) manipulates objects, actions, roles, settings, etc to provide

an almost infinite combination of card sequences through a set of card which can be unlimitedly expanded and through a theoretically unlimited set of levels of difficulty.



Figure 5 - The Vlad serious game Game Board.

- The monitoring and users' performance measuring system which is devoted to the acquisition of qualitative and quantitative parameters (metrics) uniquely defining any player's (user's) performance. Standard and innovative metrics have to be monitored, like ones in the following list:
  - The latency time, general and when key moves occur.
  - Execution time for (every) function.
  - Average execution time for function normalized by the number of the used cards.
  - The total execution time for the session.
  - The number of cards on the Game Board and their frequency as one card can be used several times.

The system must be also able to record the storytelling process and make it available for off-line analysis (ex-post)

together with the values of the measured execution and performance parameters.

## 2.2. Vlad General Architecture.

As any other software, Vlad can be represented by a Finite Automaton, namely a *Finite State Machine* (FSM) or *Finite State Automaton* (FSA, plural: automata), or simply a *State Machine*, which is a mathematical model of computation. It is an abstract machine that *can be in exactly one of a finite number of states at any given time*. The FSM can change from one state to another in response to some external inputs; the change from one state to another is called a *transition*. Finite state machines are of two types: deterministic finite state machines (DFSM, having uniqueness of the computation) and; non-deterministic finite state machines (NFSM). A DFSM is defined by a list of its states, its initial state, and the conditions for each transition. A NFSM does not need to obey these restrictions. Thus, a deterministic finite-state machine is also non-deterministic and can be constructed as equivalent to any non-deterministic one.

The behaviour of FSM can be observed in many devices in modern society that perform a predetermined sequence of actions depending on a sequence of events with which they are presented: vending machines, dispensing products when the proper combination of coins is deposited; elevators, whose sequence of stops is determined by the floors requested by riders; and combination locks, which require the input of combination numbers in the proper order.

A *State* is a description of the status of a system that is waiting to execute a transition. A *Transition* is a set of actions to be executed when a condition is fulfilled or when an event is received. Identical stimuli trigger different actions depending on the current state. In usual representations, it is also possible to associate actions with a State:

- An *entry action*: performed when entering the state, and
- An *exit action*: performed when exiting the state.

This is exactly the case of Vlad software.

### 2.2.1 General Finite State Machine

Every FSM can be easily represented by a State Diagram and a State Transition Table. In a *State Diagram*, typically obtained through a Graph, States are represented by Nodes and Transitions through edges (oriented arches).

A very simple self-explanatory example is show in the Figure below.

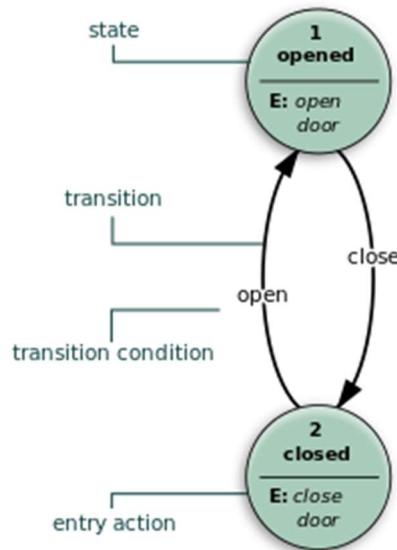


Figure 6 - An example of State Diagram.

Several state transition table types are used. The most common representation is a classical text table where state transitions arise in combination of current state (columns) and input (rows) and the corresponding cell shows the next state.

Vlad general architecture can be represented by a DSFM. A full description of the general operation of the software (based on requirements and users/designers desiderata) is depicted in the following State Diagram.

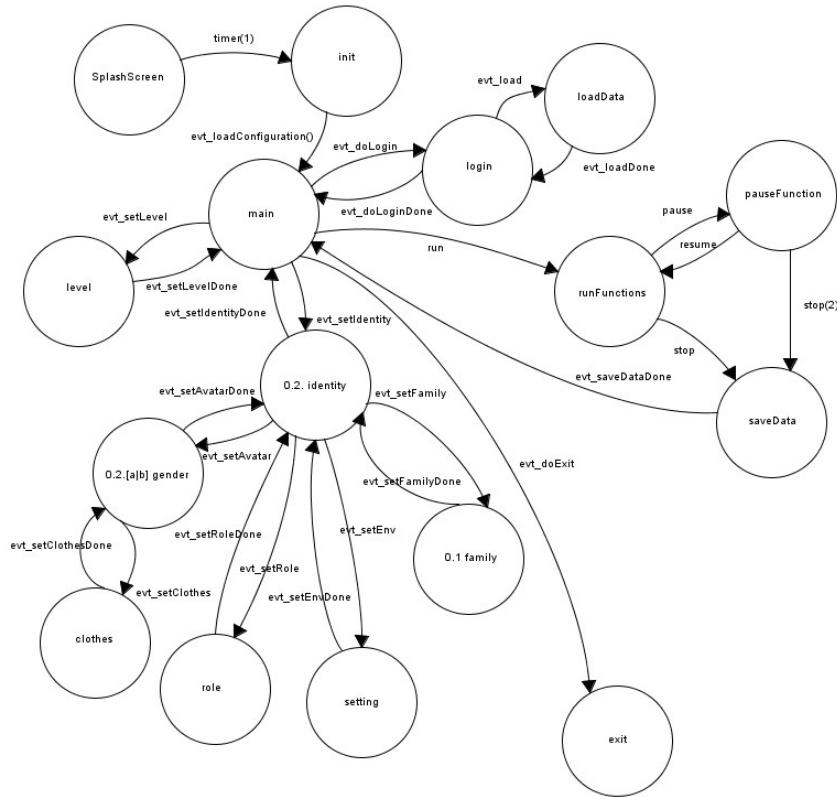


Figure 7 - The full Deterministic Finite State Machine for Vlad.

In the previous State Diagram, the States are in tight connection with the Vlad 3D Scenarios. In fact, Vlad architectural design has 4 main Scenarios and several accessory ones. The main scenarios are:

- Init, where the game is presented and the player (user) introduced to goals to be reached and actions to be performed in order to do it;
- Main, where the player chooses an Avatar for the main character of the tale so formally setting the “hero,” the protagonist of the tale; this is done through several accessory functions/scenes enabling the setting of the gender, the clothes, the role of the hero in the tale (e.g. a farmer rather than a knight), the main setting for the whole tale itself (e.g. the castle, the wood, etc), as well as the hero’s family composition; there also the chance to set the desired level of difficulty.
- Login, where the performance is bound to a specific user for archiving and personalization of the software;
- RunFunction, where the Game Board takes place and the sequence of 21 Propp’s functions deploys.

Since the Vlad DFSM is very self-explanatory, no need for a dedicated State Transition Table arose.

### 2.2.2 Adapted Finite State Machine.

Due to time and effort constraints, a reduced (but not less effective) FSM was adopted in the current implementation of Vlad. There some functions were rearranged so to enable software reuse and inheritance, some minor functions were removed or simplified by coupling with others.

There is the reason why, e.g., in the following Figure the “0.1 Family” State is not shown anymore and the “Setting” state was directly linked to “RunFunction” in order to enable a

fine-grained settings selection, which makes the general setting foreseen in the Main Scenario much less important. Operation of the Software, whose model is depicted in the following Figure showing the Adapted Finite State Machine for Vlad, will be described in detail in the next sections.

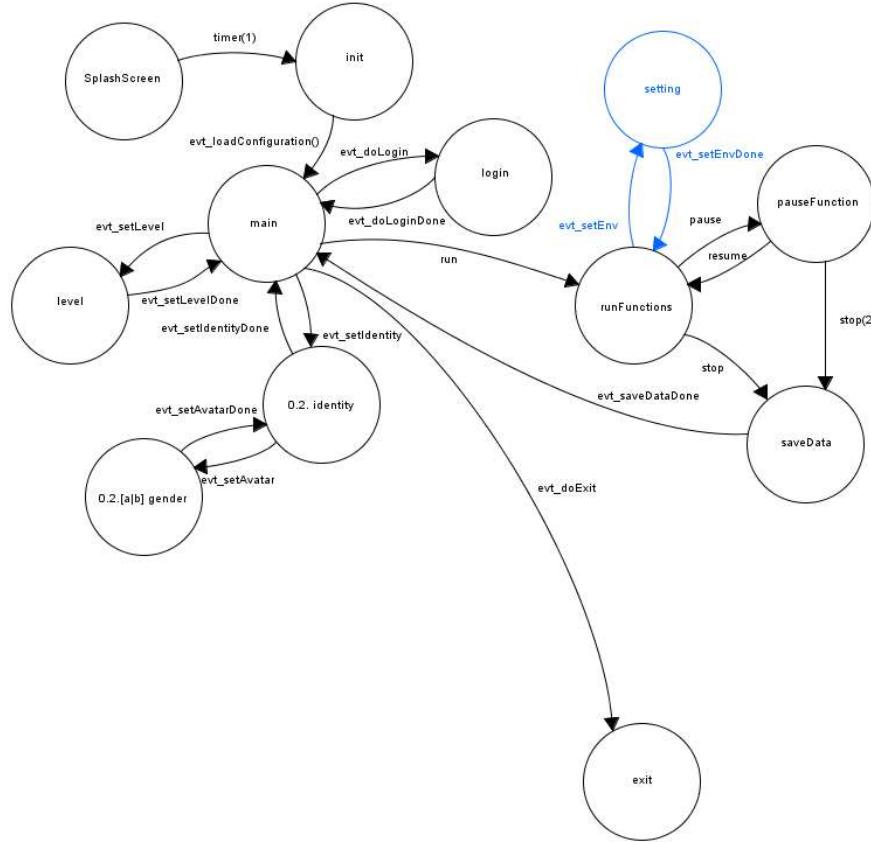


Figure 8 - The Adapted DFSM for Vlad.

### 2.2.3 Vlad Hardware and Software Components

In order to properly operate the Vlad application requires the following components be available:

- An Operational Environment represented by a 3D Space the user can navigate by his/her body while playing Vlad. This is provided by the Gaming Engine.
- Hardware is set providing the player (the user) with a 3D (or 2D as described in 2.3.1.2) representation of objects as well as an interaction means to manipulate

them through parts of his/her body (hands but not only).

- The Vlad VR Software modules as previously described in this chapter and described in depth in the following.
- The Emotion Recognition algorithm and best practice.

Every item in the previous list will be now presented.

#### 2.2.4 Software Operational Environment

Through a semi-immersive 3D Virtual Reality (VR) visualization Device (see 2.3.1) and the tracking/input system the player (the user) is placed in a “Working Space” made by a 3D Game Space where he/she interacts with a set of objects and lives a tri-dimensional Virtual Reality session enabling a Structuring of Self experience. From an external point of view the result can be considered very similar to the one depicted in the following Figure. A Virtual 3D or 2D Space is automatically provided by the integration of a 3D Gaming Engine.



Figure 9 - The 3D Game Space.

### 2.3. Hardware for Vlad Usage

Vlad is born to set up a semi-immersive VR experience in a 3D space. This is the reason why the project immediately focused on hardware dedicated to this kind of experience. Nevertheless, the software can be easily adapted to diverse fruition modes with minor effort and deploy/integrate different hardware. In the following subparagraphs we will depict the whole set of possible devices for Vlad and explain how the software can easily be modified to integrate them. This has to be done in response to the excessive cost for hardware implied by the semi-immersive version of the software.

#### 2.3.1 Visualization Hardware

Visualization is very important for the functionality of a computer graphics application, much more if the application itself is a VR solution.

### 2.3.1.1 VR Headsets/Cardboards

The only chance to have a not-too-expensive 3D VR application is to make use of *Virtual Reality headsets*. It is an innovative head-mounted device (HMD) that provides Virtual Reality for the occupant. VR headsets are widely used with video games but they are also used in other applications, including simulators and trainers. They comprise a stereoscopic head-mounted display (providing separate images for each eye), stereo sound, and head motion tracking sensors (which may include gyroscopes, accelerometers, structured light systems, etc).



Figure 10 - The OSVR HDK2 VR headset by RAZR.

The Figure above shows a typical headset, the HDK2 by OSVR (photo courtesy of OSVR). Nowadays, most common headsets have prices around a few hundred euros. Unfortunately, the cost of the workstation the headset has to be connected to, can be considerable (more than one thousand euros). This might make the investment less convenient for the specialist/user, in the aim of our project. One solution

could be represented by the adoption of Cardboards, headsets where hardware and displays are replaced by a high-quality mobile phone. Unfortunately, mobile phones having enough computational power to support a graphical application like Vlad are quite expensive as well, as much as the workstation. In addition to this, even if this allows the researcher/user to save some money, serious constraints on application development should apply (reduced number of polygons in graphics, slower computation during software runs to be taken into consideration, etc.). This has to be compared to the unique advantage of a bigger mobility due to having the software fully contained in a smartphone, with no need of a workstation. The specific goals of Vlad software make the solution based on the VR headset and the workstation much more preferable.

During the development, a new VR device has established itself on the market and has become widely used all over the world. The Oculus Quest has been launched by Oculus, the market leader of VR headset, main competitor of RAZR. The Quest replaces the usual VR headsets with a fully wireless and all-in-one device. Neither controlling from the workstation nor wires are necessary anymore for a highly impressive 3D VR experience. The Quest integrates all hardware needed for computing and it is equipped with batteries enabling the standalone use for a very comparable price. For this reason the software has been immediately ported to Oculus Quest platform and RAZR HDK device abandoned.



Figure 11 - The Oculus Quest HMD and its controllers.

### 2.3.1.2 Tablets and Smartphones

Powerful, convenient and multi-purpose smartphones and tablets are the two key players in the fast-growing world of mobile computers. Every house owns at least one of them. They cannot be ignored as means for spreading information, knowledge, and (why not) useful software applications.

The Vlad architectural design has been made so that a low-cost version of the application may be installed on Android or iOS mobile devices. All Game Engines nowadays integrate the chance to compile software for installation on Mobile Operating systems. This would of course, substantially increase the landscape of users for Vlad by clearly renouncing to have a Virtual Reality software in spite of a 2D App. Even if this line of development is out of interest for this work, the software has been developed by keeping full compatibility with Mobile Devices so that it can be turned into a 2D Mobile App with just a few changes.

### 2.3.2 Interaction Hardware

Dedicated hardware and proper software integration in the Vlad application must be provided to enable interaction between the player and the software. The hardware devoted to control Human Machine Interaction in a Virtual Reality environment is quite often called the *Controller*. Here follows a list of possible hardware solutions for interaction.

#### 2.3.2.1 Motion Controllers

Controllers help you interact with the virtual world. As the VR industry is growing, there are several types of controllers used to interact with virtual content. Among these:

- Standard Gamepads: similar to controllers used for the Sony PlayStation or Microsoft Xbox, gamepads can be used to interact with Virtual Reality objects and environments. Even not providing the most immersive solution, they allow control for movement and interaction in a format that most gamers are familiar with.
- Motion Controllers: the most favoured form of VR controllers, usually coming in the form of twin controllers (one for each hand) and offering interactive buttons and input, while being able to track the physical movement of a user's hands in all directions, allowing for an enhanced feeling of physical presence in the game. Motion controllers can also come in the

more expensive form of gloves or cameras that track the movement of players' hands.

- Locomotive Controllers: they help simulate movement in the virtual world. While standard controllers and motion controllers can do this, locomotive controllers actually simulate walking/running. Most recent locomotive controllers can come in the form of omnidirectional treadmills, treadmills that allow the user to walk endlessly in any direction they want, or chairs that allow control for movement by leaning in different directions, etc.

There are other controller technologies being experimented with such as eye tracking, allowing users to interact with objects just by looking at them, or haptic feedback controllers, which allow simulation of touch in the virtual world. The VR industry is new and still growing, so this list should continue to grow as more companies innovate around the technology.

For this research/study Motion Controllers seemed to be the most fitting hardware among the listed ones. In the following figure, HTC Vive Controllers are shown as an example.

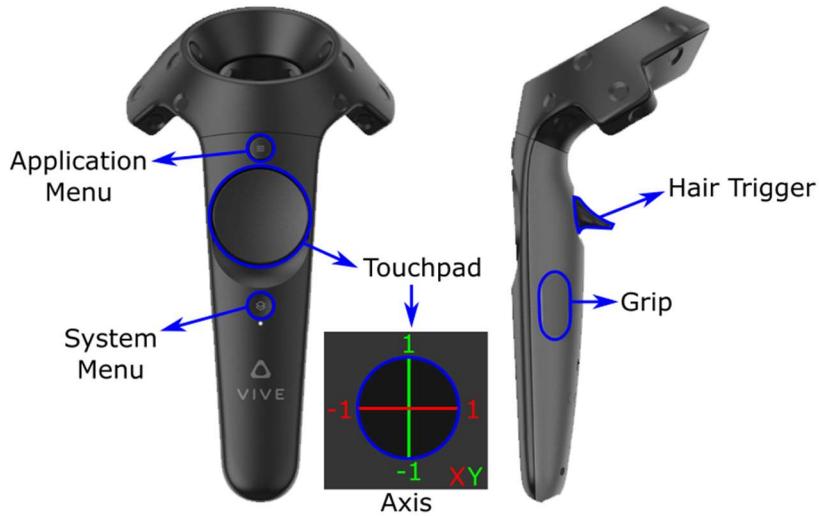


Figure 12 - HTC Vive Controllers description.

The Oculus Quest is originally equipped by a couple of Motion Controllers. For this reason the choice of integrating use of Quest in the Application, implied the use of the corresponding controllers.

### 2.3.2.2 VR Gloves

VR Gloves bring players' hands to Virtual Reality Space with very simple integration. They are, in the VR hardware market, an effective but simple to use tool to capture hand- and finger movement. Unfortunately, they are neither cheap nor fully integrated with all visualization solutions yet.

For those reasons, this work will not consider the chance to integrate gloves, at the time of this writing.



Figure 13 - An example of VR Glove (property Manus).

### 2.3.2.3 Keyboard and Mouse

Also a keyboard and mouse are quite good friends when trying to interact with Virtual Space. They came as a very cheap solution for the development of prototypes and always allow a backup solution to interact with a VR application when Controllers shut down or a supervisor wants to keep an eye on the player behaviour in the VR Space. For this reason Vlad will keep interaction through the keyboard and mouse active.

### 2.3.2.4 Touchscreens

Touchscreens can also be considered a means of interaction even if they are a 2D-born device while interaction happens in a 3D Space. Porting a click (namely “a tap”) on a 2D device is not easy at all and requires the 3D application be ported to a 2.5D perspective simulating 3D space with a set of development turnaround.

Since adoption of touchscreens would make Vlad software turn into a different software application, this task considers the chance to adopt them for interaction in the sole case of installation on Tablets and Smartphones, where touchscreens are natively available and software turns in a 2D application.

### 2.3.3 Selected hardware for Vlad v.1.0.0

The hardware initially selected for the current version of Vlad software (release 1) is the following:

- Operational Environment: 3D Space by Unity 3D Engine.
- Visualization: Razer OSVR HDK2 headset
- Interaction: Keyboard and Mouse

After the release of Oculus Quest and its integration in Vlad, the hardware list changed to:

- Operational Environment: 3D Space by Unity 3D Engine.
- Visualization: Oculus Quest All-in-one VR Gaming Headset, 128GB.
- Interaction: Touch Controllers (also Keyboard and Mouse).

## 2.4. Architecture of Vlad Application

Here follows a detailed description of all Vlad application scenarios (forms, etc) so that operation can be understood in depth.

#### 2.4.1 Init

At application start-up the Init screen (scenario) is shown. The Init panel briefly explains the application goals and operation to the player (the user) while introducing him/her to the main activities required by Vlad. In this scenario all physical and network connections are tested in a transparent way (no notification to the user). Database connection, availability of basic configuration, availability and operation of the microphone, etc. are tested as well. Any eventual error message will show on the screen and be sent to the administrator during this phase.

It would be worth it to couple a narrative voice to every introductory message.

When clicking on the “Next” button, the Main panel Scenario is loaded.

#### 2.4.2 Main screen and the selection of the Hero

The graphic interface shows a mixed solution displaying a side menu containing several buttons for configuration purposes as well as a wider game preparation panel. This interface provides a real 3D experience where the player (the user) can prepare to start the game by interacting with 3D Avatars to set gender (rel.1, male or female) and role (King or Queen, Prince or Princess, Soldier or girl soldier, Knight or Lady, Farmer, Employee, etc). The same happens when setting the level of difficulty for the serious game.

In order to enable this behaviour, the scenario (and the panel on the screen) comprises a set of vertical sectors as a

decomposition of the horizontal screen that respectively show:

- a 3D rotating carousel for choosing the Hero's Avatar (rel.1);
- a 3D rotating carousel for choosing the level of difficulty (rel.1);
- a 3D rotating carousel for choosing Hero's family components (not implemented);
- a vertical bar with a series of buttons (icon only) for accessory functions (patient login, parameter configuration, start a new game, display results, save data, exit the application, etc.).

Once the main character and the remaining parameters have been properly configured, it is possible to start the game by switching to the Game Board screen.

#### 2.4.3 Other characters

The selection of other characters is not fundamental for the beginning of the game. So, the architectural choice has been to put them in a dedicated “Characters subpanel” in the Game Board so that they can be selected and placed on the Board whenever they are needed during the story telling.

The software comprises the 6 additional characters defined by Propp who take part in the tale together with the hero. Summarizing:

- The *Hero*, the protagonist; he/she will triumph at the end; traditionally the hero is a male protagonist whose role it is to restore normality or equilibrium. He does

this by defeating the villain(s) and winning the love of the heroine.

- The *Villain* is the cause of the disruption and the enemy of the hero. The villain may also be a threat to the safety and the wellbeing of the heroine.
- The *Dispatcher*, who sends the hero on a journey to restore equilibrium. The dispatcher may also be the father or a father figure of the heroine, sending the hero on a quest to see if he is worthy of his daughter.
- The *Donor*, who gives the hero something to help him along his journey. This gift may be a piece of advice, a skill or an object such as a weapon.
- The *Helper*, assisting the hero in restoring equilibrium. The helper may be a sidekick, with the hero throughout the game, or someone they meet along the way.
- The *Heroine*, who is usually a passive and vulnerable character, threatened by the villain and needing rescuing by the hero.
- The *False Hero*, who is a character who initially seems to be on the side of the hero but who turns against or deceives them.

For a detailed discussion on the several characters please refer to Propp's morphology.

#### 2.4.4 The 21 Propp's functions

In the Game Board scenario, all the Propp's morphology functions will take place, in a number tightly bound to the level of difficulty selected. See the Table 6 in Annex 2 to

inspect available levels of difficulty and what functions compose any of them. The more difficult one is the level, the most functions compose it so that the storytelling becomes more difficult as the level increases.

The Game Board scenario, as presented in the FSM, moves through the several functions, from a given function to the next one (and eventually to the previous one) in the Propp's sequence, re-organizing game objects and contents depending on the upcoming function (the destination one).

At the end of the game, the player both chooses to exit the game and completes the session, Vlad application returns to the Main Screen where it will be possible to show results and performance metrics, store it, start a new session, finally exit the game, etc.

The basic element of the game is the Card which can be shown by the front or back side. Cards are pre-set on the Game Board Scenario using several Thematic Panels and can be moved (placing a duplicate of the card on the next predefined region available) even multiple times on the Game Board. An example of the card, seen from the back side, is the following (rel.1).



Figure 14 - Standard Card model for Vlad.

The card reads both on the front and on the back a text describing the meaning of the card itself. On the front the card also shows a self-explanatory picture, while on the back it shows the Vlad logo.

The Game Board, in order to foster the creation of sequences of the cards and stimulate the player to produce effective storytelling, is composed by the following interacting parts:

- *Title and Control Bar*: it contains the Vlad application logo, the button to open the configuration editing panel, the buttons to move to the next and previous function, the button to pause and restart software (the current function) and the stop/kill button.



Figure 15 - The Title and Control Bar in the Game Board.

- The *Characters Panel*: it comprises the set of avatars for the seven available characters the users can involve in the tale being told. The choice of the 3D Avatar on the Main Screen sets on top of this pane the selected avatar as the hero representation. In the following Figures, the basic structure of the characters panel and the avatars for the King and the Queen are shown.



Figure 16 - The Characters' Panel.



Figure 17 - The King character.



Figure 18 - The Queen character.

- The Setting Panel: this panel contains the cards allowing to describe the setting of the events in the tale. At the moment it offers only the following alternatives: house/city/hometown, forest, meadow/countryside, and castle. These places can also be used to indicate the source or destination of a possible trip or transfer.



Figure 19 - The Settings Panel.

- The Action-Card Panel containing a set of context-sensitive cards



Figure 20 - The Action-Card Panel.

- The Game Board Panel where the cards are affixed through a Click or Drag mechanism. The succession of cards gradually affixed on the board helps the user in the narration. The cards can be dragged onto the board or removed from it with an easy gesture of the hand (tap, click on the card in the other panels). It is under verification the possibility to change the order of the cards on the Game Board by dragging.



Figure 21 - The Game Board Panel.

- The Monitoring Panel containing the overall and function Timers, the “in progress” or “not in progress” recording indicator with the related command button, the status indicator related to the proper software execution, etc. An example is provided below.



Figure 22 - The Monitoring Panel.

#### 2.4.5 Game Playing

For each of the functions starting from the first and to the last scheduled for the selected game level, the player has at his/her disposal several groups of cards which are sensitive to the context. He/she can use them in the number he/she wishes to compose the story by simply placing them on the Game Board. At the end of the narration for the current function, the game moves to the next function when clicking on the "next function" button (right arrow) in the Title and Control Bar.

#### 2.4.6 Metrics and Performance indicators

This section provides an in-depth description of all parameters monitored during the execution of Vlad. As qualitative parameters:

- Corporal expression
- Intonation pitches and voice levels
- Narratology
- Level of attention and interest
- Relationship between the hero and the player
- The player's level of involvement
- Specific word repetitions and relevance

- Repeated positioning of words (e.g. when the hero is mentioned as first in every function)
- Other emotional levels emerging from the storytelling

Quantitative and execution-related parameters are:

- Latency time, general (GLT) and for key moves (KLT)
- Single Function Execution Time (SFET)
- Average Function Action Execution Time as SFET normalized by the number of used cards in a given function (AFAET)
- The total execution time for the session (TET)
- The total number of cards on the Game Board (TNoC) and their frequency (CFV) as one card can be used several times. The CFV is automatically calculated for significant cards but can be calculated also manually if the need should arise
- The number of occurrences of the cards corresponding to the seven characters

In addition to this, the player's feelings and sensations should also be kept into consideration as well as the chance to identify arousal of defence mechanisms.

As previously mentioned, the monitoring system will also record the storytelling activity by producing an audio file for post-processing and analysis.

#### 2.4.7 Performance Recording

The availability of a full recording of the storytelling activity will foster ex-post qualitative analysis. An audio file will be stored in the application sandbox and will be available to

download. The analysis of the audio file will enable the later evaluation of several analogic or digital metrics highlighting interesting emotional aspects in the player's performance.

#### 2.4.8 Data archiving

The application takes advantage from Cloud computing capabilities by setting up a Cloud archiving space (the Sandbox). In the Sandbox, files are archived through a naming policy enabling easy recovery of items related to a given session/game instance.

The Sandbox also hosts the application Database where sessions and users details are bound in a safe manner.

#### 2.4.9 Software GDPR compliance

As of May 25 2018, personal data in EU countries is subjected to General Data Protection Regulation (GDPR). While designing the Vlad software and its related data archive, compliance with current regulation was taken into consideration. Clinical Trials users have to sign a release for these reasons.

### 2.5. Implementation tools

In order to address tasks discussed in this work, the following software was used when developing the Vlad serious game:

- 3D VR development platform: Unity 3D Engine. Unity is the ultimate game development platform. Unity can

be used to build high-quality 3D and 2D games, deploy them across mobile, desktop, VR/AR, consoles, etc.

- 2D Avatar generation: website creaavatar.it and further manipulation with PhotoShop.
- 3D Avatar generation: MakeHuman.
- Finite State Machine generation: Fizzim.

## 2.6. Emotion Recognition Algorithm

Emotion Recognition is a quite complex and variegated process where human intervention cannot be excluded. If the human-based evaluation is a more subjective process, it also allows intercept qualitative aspects the automated process quite often cannot. On the other side, automated evaluation provides standardized quantitative performance values in a deterministic and objective way, with no effort from scientists for acquisition but also not bound to the person specific aspects in any way.

The innovative solution proposed in this study/research is to provide the scientist with a “Vlad Evaluation Manual”, introducing a totally new approach, based on a mixed (automated and manned) evaluation algorithm/process able to get the best from both kinds of evaluation processes. The Manual describes the innovative emotion recognizing approach as a combination of the following elements:

- A User Questionnaire, devoted to intercept the players' feelings, determine the level of confidence and evaluate the eventual arousal of defence mechanisms as for Suppression Mental Questionnaire

- A set of mathematical tools offering the capability to quantitatively evaluate the audio recording file. Application of F-Transform and L-Transform could be able to identify frequent peaks, pitches, etc. In mathematics, the Laplace Transform (L-Transform) is an integral transform function named after its inventor Pierre-Simon Laplace. It transforms a function of a real variable  $t$  (often time) to a function of a complex variable  $s$  (complex frequency). On the other side, the Fourier transform (F-Transform) decomposes (analyses) a function of time (a signal) into its constituent frequencies. This is similar to the way a musical chord can be expressed in terms of the volumes and frequencies (or pitches) of its constituent notes. The term Fourier transform refers to both the frequency domain representation and the mathematical operation that associates the frequency domain representation to a function of time. The Fourier transform of a function of time is itself a complex-valued function of frequency, whose magnitude (modulus) represents the amount of that frequency presents in the original function, and whose argument is the phase offset of the basic sinusoid in that frequency. Those transformations have many applications in science and engineering and could be applied to emotion recognition through voice sampling as well as other mathematical functions.
- An Artificial Intelligence tool to analyse in-depth the audio files, recognize terms, count them and identify

repeating items in voice tracks. Tools like Audacity could automatically evaluate occurrences of predefined terms/words and offer a good starting point.

- A Specialist's Form containing the list of the quantitative and qualitative parameters acquired and supporting the refinement process through lists of predefined values and text areas for commenting and analysis.

The Emotion Recognition Process is the very innovative outcome of the Vlad implementation and represents a totally new application method of presented technologies and algorithms. This allows the design and development team to patent it.

## 2.7. Vlad Application development

The development of the Application started in mid-2019 and requested more than one thousand hours of graphical 2D and 3D models definition (including texturing), Virtual Reality software development (VR scenes and scripting), testing. By design the full implementation of the software would have required much higher effort. That would represent a task that one single “resource” could not address on his/her own. So, it was clear from the beginning that a compromise in development should have been necessary. By the way, postponing the full development of the application did not mean providing just a proof-of-concept. In fact, development was limited to essential elements just in its redundant or not

strictly necessary parts. In fact, the software enables the full storytelling and image manipulation experience.

As regards to the graphical elements the modelling and the texturing of characters and other graphical elements (e.g. the clothes) were repeated several times in order to ensure a detailed enough graphics experience, with the proper level of detail, together with the fluid processing of the scene in the Virtual Reality 3D environment. Some research and tests have taken place in order to identify the number of polygons for objects and surfaces which do not affect the rendering time and overall application performances. One necessary improvement is for sure the definition of the front side of all game cards whose back side is currently provided. So, in the current version of the serious game, a card is identified and recognized by the name. It would be much more impressive if it could be recognized by the front face image. This is a pure computer graphics and time consuming activity which has 100% been currently postponed. Just some of them were sketched so as to provide an example how the final version of Vlad could show. Having all the front images for the several dozens of cards would have delayed the development of the remaining elements of the game and introduced just a small added value in this phase of the App lifecycle.

Here follows some pictures taken from the developed scenes. They are taken from either an additional display screen or the internal screen capture feature available on Oculus Quest device. They do not provide the clear and “real” perceptions produced by a VR experience. They however are an easy way to partially feel (at least comparing them with the 2D ones

provided in the architectural design) the effects of being involved in a 3D VR experience.

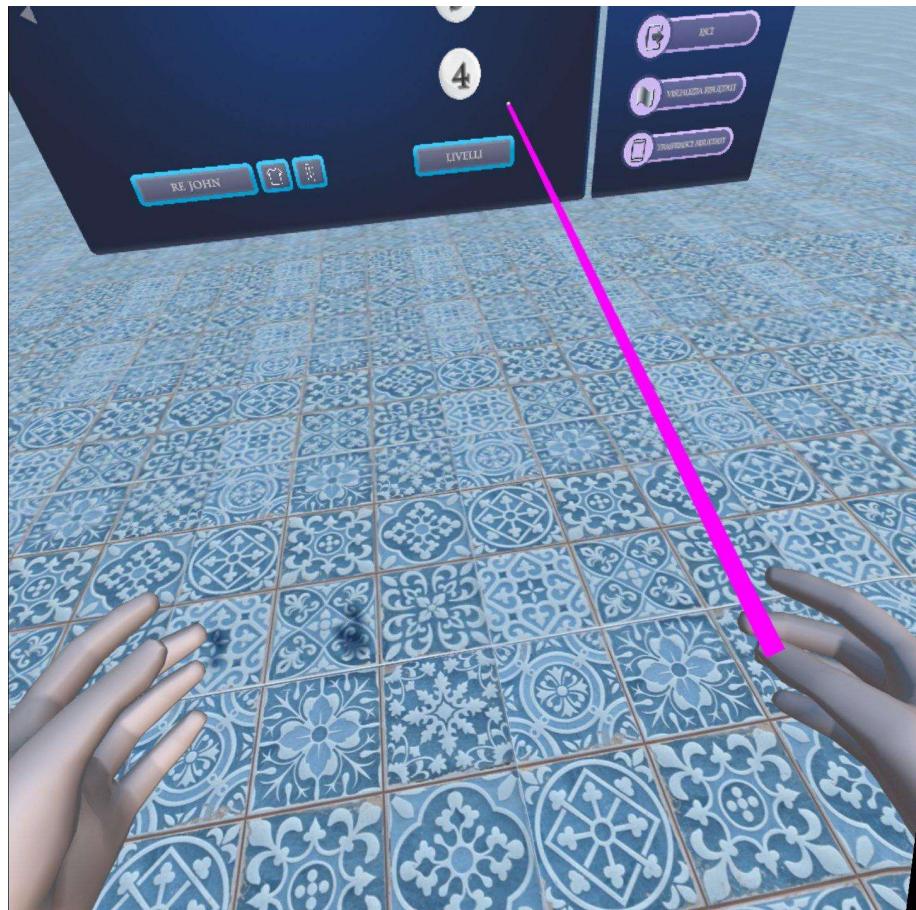


Figure 23 - The selection of game level from the patient's PoV.

Figure 23 shows the selection of the level of difficulty. As stated in the architectural design, Vlad operates through four increasing levels of difficulty, from 1 to 4. Every level provides an increasing number of Propp's functions (stages of the game) always including the ones provided by the previous levels. Before the game starts, it is also possible to set some additional parameters, like e.g. the maximum duration of the game. This set an internal timeout. When expired, the game invites the patient to exit. The setting screen is shown in Figure 24.

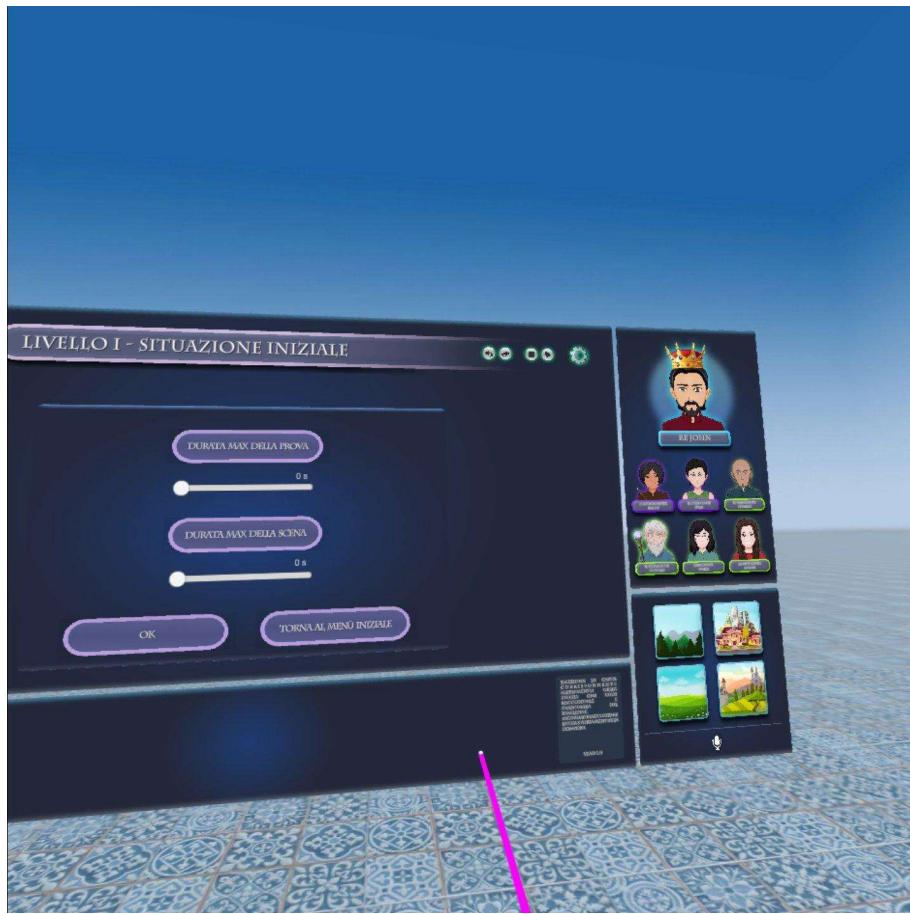


Figure 24 - The parameter setting screen before the start of the game.

In the above picture, also the selected hero is shown in the upper right corner. The other available characters are shown just below him. The dragging of their own picture towards the game board places the corresponding card in the first available cell of the game board grid. In the bottom part of the right column, four cards indicating the four locations available to place the events told in the given function (level) of the game. The patient can use any card as many times he/she wishes.

The only constraint in the current version is that, once selected, the hero (either male or female protagonist of the

tale) cannot be changed until the end of the game session. No dynamic gender change is allowed by the game.

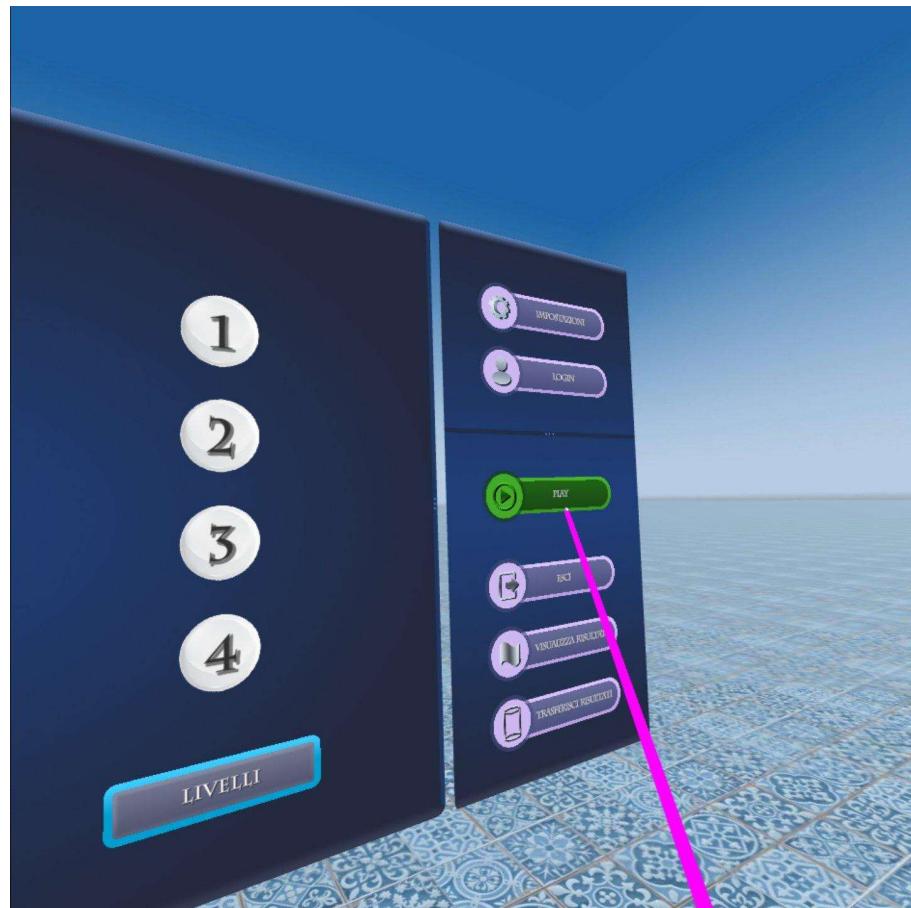


Figure 25 - The “Play game” click.

Figure 25 shows how the action of starting the game takes place. Oculus Quest offers two different ways to graphically represent the click on or manipulation of objects in the software:

- Through models of hands, or
- By a simulated laser ray.

The second option was chosen since it minimizes the physical space needed for patient’s moves.



Figure 26 - The main settings screen.

In order to make the game more amazing, the chance to configure the clothes for the hero character was introduced only. Starting from the *main settings* screen, it is possible to move to the *clothes selection screen* by clicking on the clothes button, just below the hero avatar (see Figure 26).

Some examples on what the hero looks like are presented in the following. It is also possible to turn the hero and look at him/her through a 360° perspective. Once the clothes selection screen is enabled, the panel for colour selection shows. See Figure 27 and Figure 28 showing two examples of hero personalization.

The hero changes his/her own body posture to improve the patient/player's engagement experience.

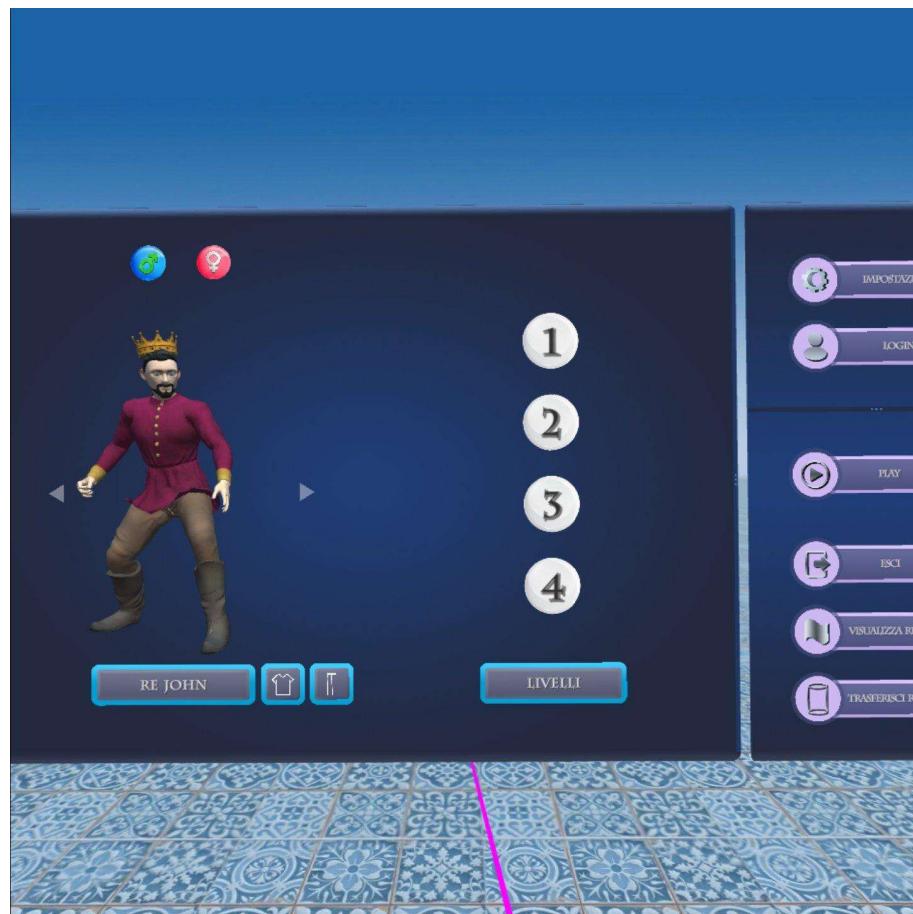


Figure 27 - The hero in dark red and brown clothes, setting done.

Six different colours per piece of clothing were established, so that 216 combinations are possible per every configurable character. The palette is shown in Figure 29 as well as the completion of the hero configuration through a click on the “Ok” button available in the bottom right hand side of the active screen.

Figure 30 shows the final game-board provided by the current version of Vlad.

Some tests were obviously run during and at the end of the development activities. Figure 31, Figure 32 and Figure 33 were taken during tests.

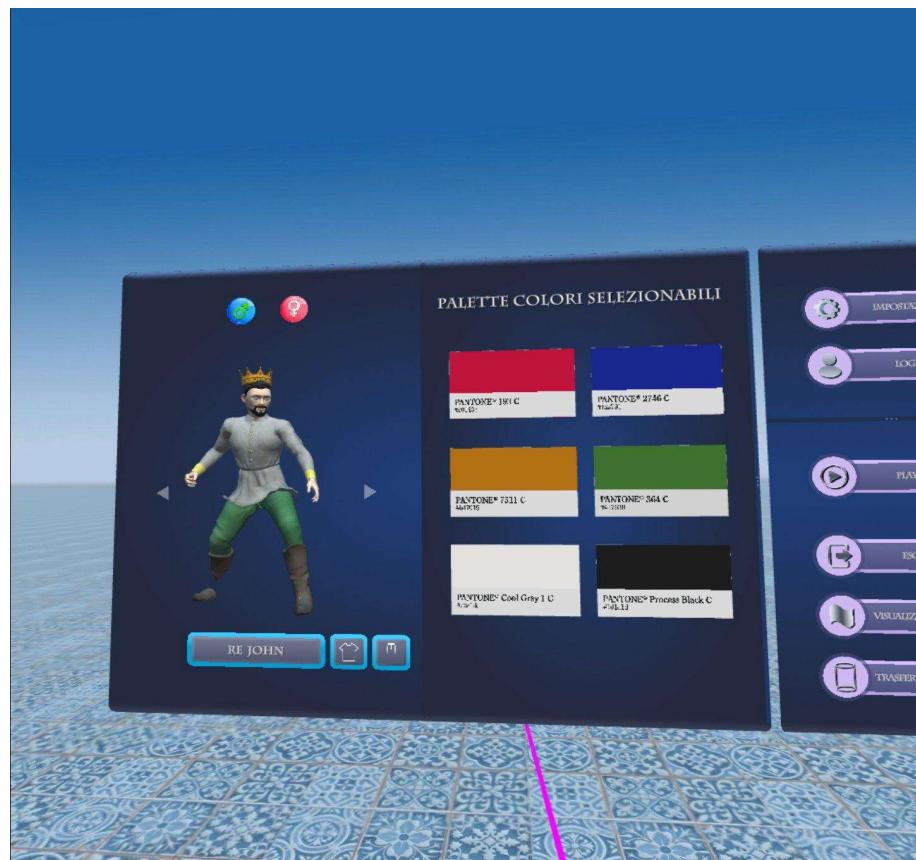


Figure 28 - The hero in grey and green clothes, ongoing setting.

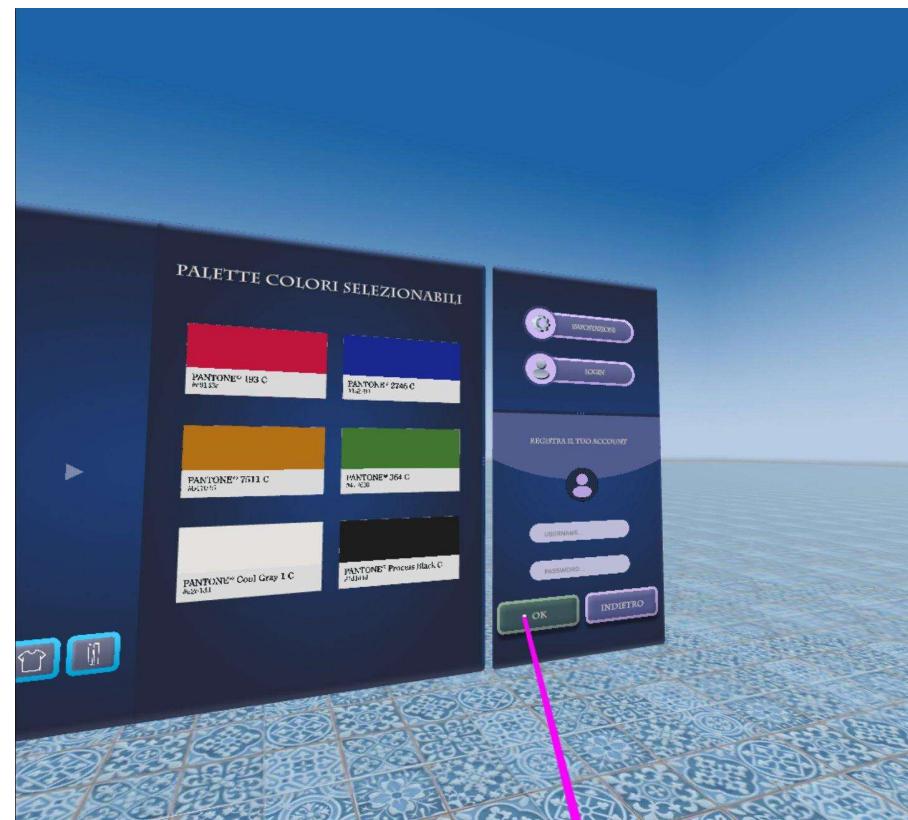


Figure 29 - Colour palette and completion of hero configuration.

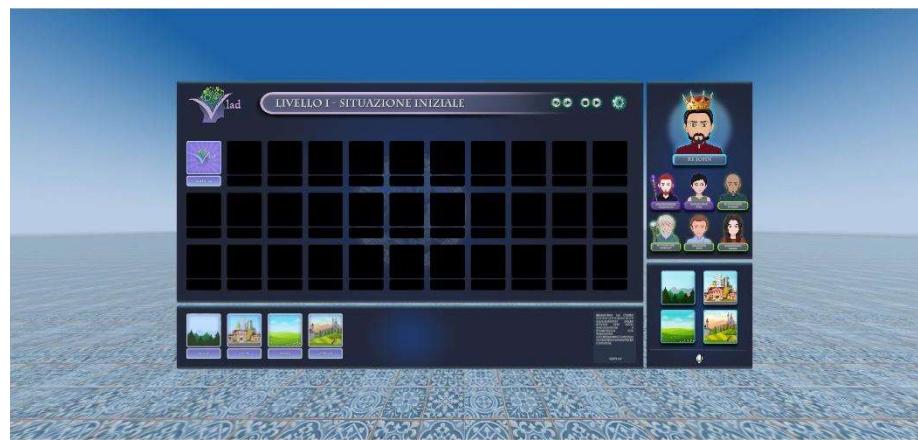


Figure 30 - The VR game-board.



Figure 31 - Vlad Test, helper selection.



Figure 32 - Vlad test, wizard selection.

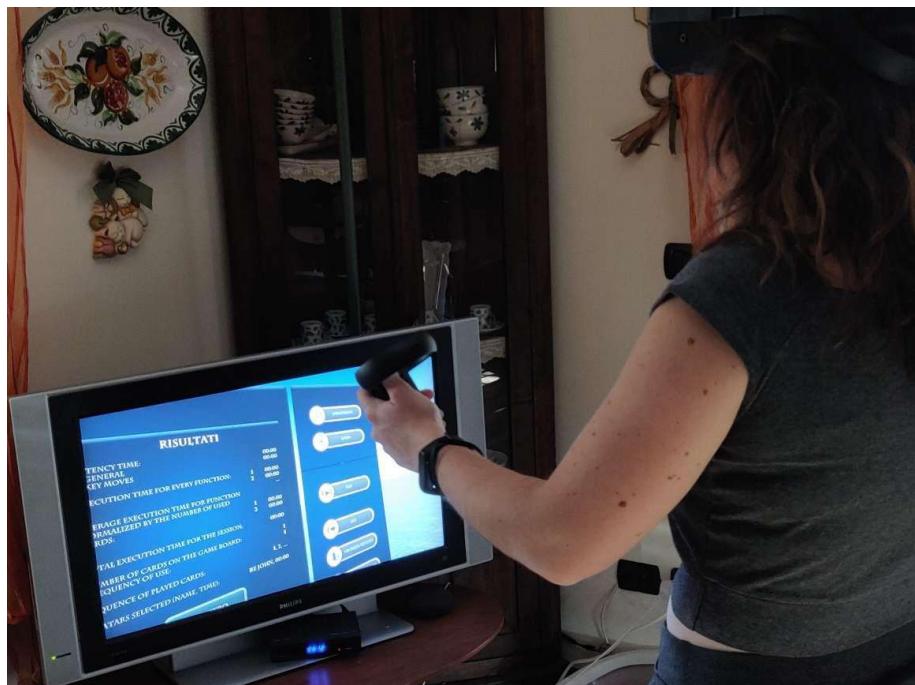


Figure 33 - Vlad test results.

## Chapter Three. Clinical trials and validation. The leaves.

### 3.1 Goals of validation

#### 3.1.1 Rationale for Goals of Validation

As reported by Li et al (2020), the term psychosomatics refers to the intersections between biological and psychological events. This is configured starting from factors related to health conditions and pathology that require a specific clinical assessment (Beuer et al., 2011).

The need for a specific framework arises from the fact that a percentage between 30 and 40% of somatic symptoms are not reflected in ordinary medical practice, therefore emotional states, compromises in the quality of life, functional manifestations and increase emerge costs for the national healthcare system due to the fact that patients undergo repeated analysis without feedback (Barsky, Orav, & Bates, 2005; Creed et al., 2018; Fava, Belaise, & Sonino, 2010; Hinz et al., 2017; Körber, Frieser, Steinbrecher, & Hiller, 2011; Wang et al., 2017). In this sense, the number of tools that can be used to detect psychosomatic phenomena has grown over time and the surveys have revealed numerous comorbidities with other pathological conditions (de Waal et al., 2009; Gierk et al., 2014; Kroenke, Spitzer, & Williams, 2002; Wang et al., 2017).

Specifically, depression, anxiety, hostility, anger, obsession symptoms and "somatic concerns" were detected throughout adolescence and adulthood before the development of a physical condition (Chida & Steptoe, 2009; Kidd &

Sheffield, 2005; Kohlmann et al., 2016; Kroenke, Jackson, & Judith Chamberlin, 1997; Kyrou et al., 2017; Ivarsson & Valderhaug, 2006; Löwe et al., 2008; McKay et al., 2006; Nakamura et al., 2013; Otterpohl et al., 2017; Miers et al., 2007; Scmitz et al., 2000). Li et al. (2020) reported that among the tools that have shown the best results, SCL-90 has proven to be an excellent tool for the detection of psychosomatic symptoms, although multidisciplinary integration remains necessary in order to guarantee the emergence of different domains (Joustra et al., 2018; Schmitz et al., 2002; San Tse, González, & Jenkins, 2018).

Regarding the assessment, Fava, Sonnito and Wise (2012) made it clear that most of the diagnostic outcomes that declare a lack of organic explanation proved inadequate. Many of the conditions that emerged through additional analysis clarify the goal of psychosomatic medicine. Several classic contributions have attempted to clearly specify the objectives of psychosomatics, as in the case of Engel and Lipowski, with particular reference to Kissen who clarified the importance of considering personal variations in pathological manifestations and the weight of psychological factors (Engel, 1967, 1977; Fava, Sonnino, & Wise, 2012; Lipowski, 1986; Kissen, 1963; Novak et al., 2007).

Fava, Sonnino and Wise (2012) report the definition borrowed from Lipowski's studies, so that psychosomatic medicine is defined as a comprehensive, interdisciplinary framework for the assessment of psychological factors affecting individuality in the course of pathological experience. This entails total patient consideration, the

integration of patient prevention and care (Fava et al., 2010; McEwen, 2007; McEwen & Stellar, 1993; Romans, 2008).

Among the variables considered to be predictive or relevant in the genesis of psychosomatic conditions, several authors have considered recent life events and chronic stress and allostatic load (Picardi & Abeni, 2001; Rozanski, Blumenthal, & Kaplan, 1999; Sonino, Tomba, & Fava, 2007; Wright, Rodriguez, & Cohen, 1998).

The scientific debate on the issue of psychological well-being has been linked to the psychosomatic issue since several contributions have proposed relevant psychological figures (Caprara, Alessandri, & Barbaranelli, 2010; Chida & Steptoe, 2008; Ryff, & Singer, 1996). Beyond positive psychology, Fava, Sonnino and Wise (2012), proposed the studies of Antonovsky (Eriksson & Lindström, 2006) regarding the sense of coherence), which emerged as strongly related to the perception of mental health states and their maintenance. The important reference to NHS spending on chronic conditions (Bodenheimer et al., 2002; Hart, 1995) informs us about the importance of scientifically evidence-based interventions.

It is essential to consider the role of the Ego within the conditions of adaptation and maladaptation, since the elicitation of the interventions, even if overcoming it, passes through the conscience of the subjects.

In 2018 Hobson, J. A., published a titled monograph "Ego damage and repair: towards a psychodynamic neurology". The contents of the work range from the fundamental themes of suggestion, to go through the analysis of the Ego, the brain

basis of normal and abnormal ego states, the psychophysiological functioning of the "construct" of Ego, to reach the dream manifestations considered neurophysiologically, maintaining the basic dynamic concepts.

The following references concern the pathological conditions and above all the therapeutic paths useful for the "repair" process. Considering Chapter V, it is possible to note the succession of topics that include psychotherapeutic meanings, phenomenological philosophical considerations, brain-mind science, the importance of personal autobiographical references, psychotraumatic conditions and the fundamental insight on the conditions experienced. These steps appear fundamental on the basis of the need to formulate the research question of this contribution.

The role of different dynamics on ego functionality has been addressed by several studies. Starting from the affective dynamics, it is known that the non-expression of emotions together with a lack of mentalization, produce pathological results starting from the chronicization of dysfunctional patterns (De Burge, 2001; Settineri et al., 2016).

As mentioned, Settineri, Frisone, Alibrandi and Merlo in 2019, highlight how the presence of preliminary conditions for the development of somatic conditions is predictive of the onset of psychosomatic illnesses (Szwee, 2018; Warnes & Finkelstein, 1971; Wolf, Gerlach, & Merkle, 2018). The development and reiteration of specific defensive patterns lead subjects to maintain conditions.

The first chapter, paragraphs 1.1, 1.2, 1.3, 1.4, 1.5, introduced the psychosomatic issue with precise references to the phenomenology of images, to the defences, to the French school and to applications in virtual reality. The application level proposed the use of a methodology applied in the field of literature, which had the advantage of producing morphological and functional classifications of bodies responsible for carrying out stories, which proved to be possible funds for active and proactive identification (Propp, 1928).

As it happens in the field of projective methods, we are faced with the concepts of identification and apperception at the basis of psychodiagnostic tools known in the field of the clinic. Settineri & Merlo in 2019, produced a manuscript that clarifies in detail the dynamics mentioned above. The issue of apperception (Herbart, 1824, 1825; Lange, 1899; Stout, 1896) is fundamental in order to understand how personal psychological conditions can be translated to clinical situations.

### 3.1.2 General methodologies and validation issues

The goal of most research methodologies is to elaborate a theory able to clarify and explain all the relationships which threaten or might threat the *validity* of the author's conclusions. This is extremely dangerous for the researchers since most of them are designed to enable the chance to make conclusions on causal (also known as dependency) relationships between the involved variables. In the first

statement of this section, the term *validity* simply refers to the correctness of researcher's conclusions and research outcomes, to that fact that the *conclusions reached are true, are real.*

When it is not difficult to refute the conclusion(s) stating the dependency relationships between effects and causes or the theoretical explanation of the relationship hypnotized, the validity lacks.

Validity can be classified as follows (Cook et al, 1990) when dealing with research design and validation activities:

- Internal validity;
- Construct validity;
- External validity;
- Statistical validity.

**Internal validity** exists when the given research has clear reasons to demonstrate that a causal relationship takes place between independent and dependent variables, since the independent variable produces changes on the dependent one. This kind of validity is fundamental because it directly refers to relationship logic. Quite often covariation or confusion between important and independent variables are the main causes for the lack of internal validity. Since separation of independent variables from important ones is fully subjective and based on value judgment, it is not possible to zero the risk related to the lack of internal validity especially when it is difficult for the researcher to control the independent variable.

**Construct validity** concerns the conformity between the theory the research is based on and the results. In practice, the lack of construct validity implies that a different theory could lead to the same results. This could be due to the fact that any research is not built on a single isolated hypothesis but a set of auxiliary hypotheses also contributes to reach the results. The validity of measures directly depends on the whole set of hypotheses. Validating constructs is generally not fully possible, but some work can always be done to increase the plausibility of the research. It can be done, e.g., by adopting standardized scales and methodologies already used thousands of times.

Construct and internal validity are alike: the former requires to exclude other theoretical explanations of results, the latter removes alternative causes of the examined behaviour. In both cases another experiment could be necessary in order to govern the threat to validity. For the internal one, the research could be re-designed in order to control the source of ambiguity or confusion. For construct validity, the several theoretical approaches could be compared in a new experiment.

**External Validity** refers to the applicability of results not only to similar (identical) situations but extendable also to contexts where at least one element of the setting (subjects, places, time, etc.) changes.

**Statistical Validity** points to the causal relationship between independent and dependent variables and attempts to validate

it. It states whether the relationship is really causal or accidental.

There is no absolute method to ensure none of the four validity types but, all methods can help in increasing the trust level of the results.

The concept of Control is crucial in order to govern the several threats to validity, so that every time people think of research an implicit or explicit reference to control groups is done. Indeed, a lot of experiments conducted in lack of control groups do exist as well as a lot where a control group not subjected to the action of the independent variable makes no sense. **Control** can be defined as every means used to remove or mitigate the threats to the validity of a research. In Psychology the meaning of control is twofold. The main one for this study is as “point of comparison”, a fixed point to compare the effects of a given independent variable towards. If two experimental conditions differ for a unique independent variable, whatever difference arising from treatment (with the respect to the lack of treatment) can be bound to the action of the given independent variable. Even the control group methodology is effective to control external causes, it is not the only one available: control can be set up even in lack of a control group. E.g., in the methodology of the “control condition” the conditions are used to determine different effects.

When you want to adopt a control methodology in a single study, there are two ways of assigning participants to multiple conditions:

- In **between-subjects** (or between-groups) research designs, different people test or are subjected to each condition, so that each person is only exposed to a single set of conditions or, in the IT sector, to different software or user interfaces.
- In **within-subjects** (or repeated-measures) research designs, the same person tests or is subjected to all the conditions (i.e., all the user interfaces, the full application).

The second meaning of the term Control is as “a way to mitigate, limit, and drive variability sources” (Boring 1954; 1969). When the sources of variability in an experiment have been limited and the behaviour is highly predictable, the *experimental control* takes place.

While the main meaning allows to state that a dependent variable is only bound to an independent one (control experiment), the second meaning enables the chance to state that by limiting active variables or their ranges (experimental control). So the two meanings are definitely bound to each other (Sidman, 1960; 1988). The experimental control leads to an improved chance to implement a control experiment, so remove alternative explanation of research results.

### 3.2 Validation scenarios

On the basis of the abovementioned rationale (see Section 3.1) the designed validation protocol foresees the use of five elements:

- For the psychosomatics research
  - The Suppression Mental Questionnaire (SMQ);
  - The Diagnostic Criteria For Psychosomatic Research (DCPR);
- For the evaluation of defence mechanisms and of the resiliency of Ego
  - The 40-item version of the Defence Style Questionnaire (DSQ-40).
  - The Toronto Alexithymia Scale (TAS-20);
  - Ego Resiliency Scale Revisited (ER89-Revisited);

### **DSQ-40 Defensive Style Questionnaire**

According to Tapp et al. (2017, p.3), “Defence mechanisms are defined as automatic, often involuntary psychological processes that occur out of a person’s awareness, protecting them from anxieties and other internal or external stressors” (Bond & Vaillant, 1986; Cramer, 1991; Freud, 1926). As reported by Frama and Cortinovis (2000) in the context of the Italian use of the DSQ-40, Bond (1983) developed a questionnaire, the Defence Style Questionnaire (DSQ), in order to detect the manifestations of the characteristic style of the subject in managing conflict, conscious or unconscious.

The four factors were named: maladaptive action defences, image-distorting defences, self-sacrificing defences, adaptive defences. Subsequently Andrews through factorial analysis managed to highlight three main factors under which the defences considered were aggregated. He described as

mature style the one in which the threat is recognized and the pain is controlled until the end of the process; The neurotic style is the one in which the event is recognized, responsibility is accepted but the meaning is reversed; and as an immature style in which the threat is denied or responsibility is transferred. In a later study (Andrews, Singh & Bond 1993) he derived a 40 item DSQ which contains two items for each defence mechanism.

As reported by Frama and Cortinovis (2000), the 40 items / 20 mechanisms were grouped into three groups: mature (4 defences: sublimation, humour, anticipation and suppression), neurotic (4 defences: cancellation, pseudo-altruism, idealization and reactive training) and immature (12 defences: projection, passive aggression, acting out, isolation, devaluation, autistic fantasy, denial, displacement, dissociation, splitting, rationalization and somatization). Each item is rated on a 9-point Likert ordinal scale. Each of the three defence styles/factors appeared sufficiently homogeneous ( $\alpha > 0.50$ ), in particular the immature one ( $\alpha = 0.80$ ).

The Italian version of the DSQ-40 can be found in Annex 3 (see Table 7) and the Common Defence Styles table (see Table 8) in Annex 4.

### **SMQ-Suppression Mental Questionnaire**

The Suppression Mental Questionnaire (SMQ) (Settineri et al., 2016, 2019) is a self-report scale based on 18 items. The 18 items adhere to three different factors: Repressive

function, Regression in the service of the Ego and Rationalization.

The preliminary study (Settineri et al., 2016) demonstrated a good sampling adequacy ( $K.M.O. = 0,648$ ), producing the following Cronbach's alpha coefficients: Repressive function= 0.742; Regression in the service of the Ego = 0.804; Rationalization = 0.698. The items were structured on the basis of a 5-points ordinal Likert scale. About the items assignment, the factors comprehended:

- Factor 1, items 3, 4, 7, 8, 10, 14, 15, 16, 17, 18;
- Factor 2, items 5, 6, 9, 11, 12;
- Factor 3, items 1, 2, 7, 13.

Subsequent research (45) provided the following Cronbach's alpha coefficients: 0.73 for the first factor, 0.77 for the second and 0.76 for the last one.

The Italian version of the SMQ can be found in Annex 7.

### **TAS-20 Toronto Alexithymia Scale**

The Toronto Alexithymia Scale (Bagby, Parker, & Taylor, 1994) is a well-known self-report instrument consisting of 20 items, based on a 5-points Likert scale. The original version of the TAS-20 demonstrated an internal consistency of 0.81 (Cronbach's alphas; p.27), reporting a three factors structure accounting the 31% of the total variance, respectively:

- Difficulty in Identifying Feelings (0.78),
- Difficulty in Describing Feelings (0.75), and
- Externally Oriented Thinking (0.66).

In 1996 Bressi et al., published a cross validation of the Tas-20, performing the psychometric analyses with regard to both clinical and non-clinical subjects. In detail, the alpha coefficient scores obtained with the non-clinic sample were 0.75 for the total scale, 0.77, 0.67 and 0.52 respectively for the first, the second and the third factors; the clinical sample scores were 0.82 for the full scale, 0.79, 0.68 and 0.54 for the three factors (38, p. 556). Further studies (Caretti et al., 2011; Craparo, Faraci, & Gori, 2015) analysed the psychometric properties of the scale, highlighting the good consistency and reliability of the three-factor structure.

Annex 6 shows the Italian version of the DSQ-40.

### **DCPR-Diagnostic Criteria for Psychosomatic Research**

According to Settineri, Frisone, Alibrandi and Merlo (2019), DCPR is a clinical interview based on diagnostic criteria provided by Fava et al. (1995) whose structured interview is contained in the monograph by Porcelli and Sonino (2007); a set of 12 syndromes was provided: disease phobia, thanatophobia, health anxiety, illness denial, persistent somatization, functional somatic symptoms secondary to a psychiatric disorder, conversion symptoms, anniversary reaction, irritable mood, type A behaviour, demoralization, and alexithymia. According to Galeazzi et al. (2004) the items of the DCPR showed a high showed interrater reliability with kappa values:

Disease phobia, kappa 0.97; Thanatophobia, kappa 0.92; Type A behavior, kappa 0.92, Illness denial, kappa 0.90;

Demoralization, kappa 0.90; Anniversary reaction, kappa 0.90; Health anxiety, kappa 0.89; Alexithymia, kappa 0.89; Conversion symptoms, kappa 0.82; Persistent somatization, kappa 0.70; Irritable mood, kappa 0.69.

The Italian version of the DCPR is included in Annex 5.

### **ER89-Ego Resiliency Scale-Revisited**

The Italian version of the Ego Resiliency scale (Caprara et al., 2003) was adapted for Italian population on the basis of the Block and Kremen's (1996) original version. It is composed of 14 items based on a 7-point Likert scale. The original work reported the alpha coefficient for reliability as adequate (.76 for being a short inventory scale; Block & Kremen, 1996, p. 352).

As highlighted by Alessandri et al. (2011), the coefficients of ER were .77 in the United States, .84 in Italy, and .86 in Spain.

The Italian version of the ER-89 Revisited can be found in Annex 8.

### **3.3 Criteria of selection of sample for validation**

As suggested by Settineri, Frisone, Alibrandi and Merlo (2019), the psychosomatic manifestations can be referred mainly to dermatological, endocrinological, oncological, cardiological, gastrointestinal domains, primary care frequent and normal attenders, consultation liaison

psychiatry and community sample, according to Picardi et al. (2006), Grandi et al. (2001), Rafinelli et al. 82003, 2006), Porcelli, De Carne and Fava (2000), Carrozzino and Porcelli (2018), Kano et al. (2018), Grassi et al. (2005), Sonnino et al. (2007), Ferrari et al. (2008), Galeazzi et al. (2004), Porcelli et al. (2009), Mangelli et al. (2006), Porcelli & Rafanelli, 2010).

The individuals involved in the study must satisfy specific criteria, in order to adhere both to the experimental and control group. Specifically, the participants will be adults and considered on the basis of the diagnosed psychosomatic conditions. The diagnosis of the considered phenomena represents the mandatory condition in order to be involved. The including criteria will be compliant with Porcelli and Rafanelli Criteria for psychosomatic research in the medical setting (2010). For all members of the experimental and control group, vision and hearing capabilities must be sufficiently intact.

The following psycho-diagnostic path represents the basis of the main baseline. The emerging psychological and psychopathological conditions will be considered in order to assess the subjects before the treatment phase.

The patients will be invited to start the psycho-diagnostic practice and to test the usability of the treatment tool above presented in terms of architecture and structure.

The compilation of the questionnaires will be of a paper and pencil type and each participant before the signing of the

informed consent will be informed about the anonymous nature of the methods of data processing.

Specifically, the research will be conducted with respect for the rights of the participants, according to the World Medical Association Declaration of Helsinki and its amendments. The data will be analysed anonymously in compliance with the rules protecting personal data (GDPR, European regulation EU 2016/679).

The subjects will be informed that in compliance with art. 13 of GDPR and in relation to the information on which it will be accessed, for the purpose of the protection of subjects regarding the processing of personal data, we inform you that:

- The data provided will be assigned / selected for research purposes
- The data will be evaluated only according to the consent that one will decide to express at the end of this form
- The data will be collected and stored anonymously --- The treatment will also take place in accordance with the aforementioned GDPR. Under no circumstances it will be possible to trace the identity of the parties concerned by the protocol. The data will then be processed statistically by the researchers, as subjects managed for the treatment and involved in the research.
- During the collection phase, no one outside the researchers involved will have access to the data.

During the data publication phase, it will in no way be possible to trace a result back to the identity of one or more participants, from the moment the data will be processed anonymously.

The study duration with the participants, including the baseline, the treatment and the subsequent testing will be about 2 and 1 hours respectively for baseline and treatment phases.

### 3.4 Design of the Clinical Trial

Being that Vlad is a quite complex 3D VR software tool aimed to treat diseases on human beings, the validation process for it goes beyond the principles enlisted in the section 3.1.2. In compliance with this, it is easy to state the goal of the designed Clinical Trial is obviously twofold.

On one side, it is devoted to validating the effectiveness of the Vlad Application as a means to provide a treatment of psychosomatic diseases as well as a creativity stimulation tool. That will be done through a three-step comparison.

On the other side, the Validation process must also be aimed to evaluate the level of usability and the likeability of the Vlad App as a Virtual Reality software tool by following an approach based on a before-after comparison. In fact, the involvement of the patient in an amazing and enjoying gaming experience fosters the level of engagement. This ensures that the patient completes the full treatment protocol with very low distress, in the shortest time possible, and that his/her performance improves quickly.

The Clinical Trial will be discussed in this section, while software validation will be introduced in the next one (Section 3.5).

Both terms of the validation process can be merged into a unique Clinical Trial to be mapped on an A-B-A'-B'-A" model, under the unique condition ensuring that all the participant to the Clinical Trial will have a minimum set of capabilities in the aim of computer literacy which allows them to interact with a Virtual Reality environment, together with sufficient eye-hand coordination and visual-spatial capabilities.

For the Clinical Trial the sample is composed by 30 patients with psychosomatic disease diagnosis and compliant with criteria described in Section 3.3.

### 3.4.1 Protocol

Two general principles underlie the design Clinical intervention: the centrality of the patient and the pedagogy of mediation. In the person-task-mediator triad, the latter has the function of stimulating the patient's active response by providing him with all the necessary help (and only the necessary help), according to the typical approach of "error-free learning". A means of verification is through checking the effectiveness of an integrated non-intensive treatment on increasing skills in the area of creativity and communication.

The intervention foresees thirteen 1-hour-long weekly sessions to be scheduled by the following *A-B-A'-B'-A''* model:

- In the **initial medical history and assessment session (A)** the patient will be requested to fill a set questionnaires for the ex-ante assessment:
  - SMQ
  - DCPR
  - DSQ-40
  - TAS-20
  - ER-89
- In the following **mixed training-treatment phase (B)**, including five sessions where, by using the Vlad App, the patient will participate to:
  - *One training session* on the use of the App;
  - *Four treatment sessions* with increasing level of difficulty (two sessions on level 1, two sessions on level 2)
- In the aim of the **middle-term assessment session (A')** the patient will be requested to fill the same questionnaires as in phase A
- in the **second treatment phase (B')** comprising five more sessions where the Vlad App will be used with upper levels of difficulty (two sessions on level 3, three sessions on level 4)
- The (ex-post) **final assessment session (A'')** requiring the questionnaires be filled again

The level of difficulty selected has no impact on the overall validation process. So, the psychologist can freely adapt the level of difficulty to the patient's own performance and capabilities.

The designed Clinical Trial requires a total amount of 800 hours for the Clinical Validation of Vlad App comprising:

- 390 1-hour-long sessions (30 patients, 30 sessions each) for the experimental group
- 390 sessions for the control group, to be treated through classical approach
- 20 hours for results analysis

The number of patients needed to address this task and the lockdown issues related to COVID-19 epidemic outbreak during the first semester of 2020 practically zeroed the chances to set up and run any sort of effective and valuable Clinical Trial. For this reason the clinical validation of Vlad has been postponed to a later phase, also dedicated to improve the outcomes with additional research and to introduce further development for system operational and graphical features enhancement. Anyhow, due to the considerable effort required by Clinical Validation and the need to involve a psychologist providing supervision and help during the several sessions foreseen, since the beginning it seemed clear that Clinical Validation should be addressed in a later phase of the research (e.g. a follow-up funded project). So, the foreseen minimum goals for this research activity had initially been set to:

- Introducing a new methodology to treat psychosomatic diseases through image manipulation and storytelling;
- Providing the architectural design and the implementation of the corresponding virtual reality software
- Validating the software application built as a software tool (see Section 3.5) and not as a medical device

### 3.5 Design of the Software Validation

As stated in the Section 3.4, the software validation process aims to evaluate the two following indicators:

- The level of usability of the Vlad App software, and
- The likeability of the Vlad App as a serious game

As it can be easily understood, the software validation focuses on the application as a form of software. In this aim, no binding between the software usability (as well as likeability) and the clinical methodologies and outcomes is neither foreseen nor evaluated. The adopted approach looks at the software as a “black box” from an external point of view and limits its analysis to the features devoted to Human-Machine interaction and the capability to retain a user (a patient) until the completion of the long term task. This is done under the hypothesis that the output of the software be properly calculated and usable for research and data analysis (correctness by design).

In this aim, every consideration on usability must take into consideration all aspects related to the easy interaction

between user and software (software user-friendship). This is much more necessary when interaction happens through unusual devices, e.g. the controllers. For this reason, the evaluation must take into consideration elements like:

- The existence of physical or software obstacles towards (or limiting) the proper use,
- Malfunctioning or anomalies in software compromising usability,
- The limitation to ergonomics (e.g. wrong controller device for left-handed patients).

In regards to the likeability of the Vlad game, the capability of the software to enable the patient's involvement through an amazing game must be evaluated. A set of questions have to be used to evaluate the software effects on the patient's availability to live the gaming experience repeatedly, by generating a high enough level of engagement.

### 3.5.1 Protocol

As far as the Vlad software application validation is concerned, the designed protocol makes use of three different questionnaires:

- The **Computer Literacy Questionnaire** assessing that the patient owns at least a knowledge base on the simplest electronics and IT simplest (dealing with televisions, internet navigation, etc.) in order to ensure that he/she is able to understand training and instructions to interact with the software as well as exchange information with psychologists (for clinical

aspects) and engineers for eventual technological issues; the patient is not requested to be an IT expert; The Italian and English version of the Computer Literacy Questionnaire can be found in Annex 9 and Annex 10;

- The survey on patient's requirements or expectations on the creativity training experience, enabling a study providing study on how to measure and improve the creativity of our patients; the **Patient's Requirement Questionnaire** is available in both Italian (Annex 11) and English languages (Annex 12);
- The **Likeability Questionnaire** (Annex 13 contains the Italian version, Annex 14 the English one) acquiring information on likeability of the software, the patient's satisfaction level and availability to keep training with Vlad, improving his/her storytelling and creative capabilities.

The protocol will be composed by three different phases:

- An **initial assessment** when the patient will be requested to fill both the Computer Literacy Questionnaire and the Patient's Requirement Questionnaire;
- An intermediate **playing period** when the user will be first trained on the use of Vlad (one session) and then have the chance to play Vlad through several sessions, with different level of difficulty;
- A subsequent **final assessment** (on the last session) asking the patient to fill the Patient's Requirement

Questionnaire again and the Likeability Questionnaire as well.

It is evident how the three phases can be mapped on similar phases in the Clinical Trial design. In fact, the initial assessment in the above list can be run during the *initial medical history and assessment session* (A), the playing period can be bound to the mixed training-treatment phase (B) and the final assessment to either the middle-term or the (A') final assessment session (A''). As a simplification, in the hypothesis that the Clinical Trial were performed, the final assessment should have been conducted simultaneously for both the validation protocols, so A'' would have been the selected phase to schedule them.

### 3.5.2 Sars-CoV-2-related issues

Despite the normal workplace cleaning procedures being applied for the room where the validation takes place, it is important to keep into consideration that:

- The compliance with the thirteen points enlisted in the COVID-19 (Sars-CoV-2) Safety Protocol issues by the Health Ministry (in agreement with unions and businesses representatives) must be ensured;
- In addition to this, the hosting organisation must provide disinfection activities for spaces and devices (especially for the wearable ones, like Oculus Quest);
- Both patients and scientists must wear proper personal protective equipment in compliance with regulations and follow the “stay apart” rule during every session.

For this reason the schedule of the training sessions cannot be too close together in order to allow cleaning and disinfection operations to take place, especially when spaces and devices are shared among several patients. A calendar must be properly set in case of an intensive trial.

### 3.6 Combined Protocol

With respect to the contents of Section 3.4 and Section 3.5, the combined validation protocol, summarising the need and the actions required by the two designed validation processes, is based on thirteen 1-hour-long weekly sessions keeping the *A-B-A'-B'-A*” model as its base:

- In the combined **initial medical history and assessment session** (always indicated by letter A) the patient will be requested to fill out: (compiare)
  - The Computer Literacy Questionnaire;
  - The Patient's Requirements Questionnaire;
  - A set questionnaire for the ex-ante assessment of psychosomatic and resiliency of Ego:
    - SMQ
    - DCPR
    - DSQ-40
    - TAS-20
    - ER-89
- A **mixed training-treatment phase** (B) follows as defined in the Clinical Trial protocol (five sessions: one training session on the use of Vlad; four treatment sessions with increasing level of difficulty);

- A **middle-term assessment session (A')** as defined in Section 3.4.1;
- in the **second treatment phase (B')** comprising five sessions as in Section 3.4.1;
- The **final assessment session (A'')** requiring the following questionnaires be filled:
  - The Likeability Questionnaire;
  - The Patient's Requirements Questionnaire;
  - Set questionnaires for the ex-ante assessment of psychosomatic and resiliency of Ego:
    - SMQ
    - DCPR
    - DSQ-40
    - TAS-20
    - ER-89

### 3.7 Results

Vlad is the first emotion generator and recognizer based on Computer Graphics, in the form of a 3D Virtual Reality video game involving image manipulation, qualitative and quantitative monitoring, and a series of storytelling experiences.

By wearing an Oculus Quest, a 3D VR headset equipped with a set of controllers, the player (the user) finds himself located within a three-dimensional immersive space: the “Game Space.” There he/she lives an immersive, interactive experience in the form of a serious game putting in place a

totally new creative process while they manipulate a set of objects in the 3D virtual space.

Vlad game is a 3D VR software using a 21-function-cards version of the Propp's morphology of the folktale, setting up Virtual Reality game sessions enabling a fully innovative experience for the structuring of the Self. The goal is to foster the storytelling process through an immersive experience aimed to manipulate images/objects in the 3D space. Based on an endearing and amazing context, Vlad is designed to be intuitive and easy-to-use.

The software also designed a completely new emotion evaluation approach, based on a mixed (automated and manned) evaluation algorithm.

Therefore, Vlad may represent an innovative possibility for treating a number of outcomes due to emotional maladjustment or even addictions, where the structuring of the Self in accordance with affectivity is an essential step for recovery.

Vlad had the need to be subjected to a two-fold validation process:

- Software Validation, and
- Clinical Trials

Please refer to Sections 3.4, 3.5, 3.6 for deeper descriptions of the designed validation protocols.

As explained in Section 3.4.1, in order to allow the Clinical Trial in a later phase, the validation process for Vlad took place among this research activity. In fact, as discussed in the previous sections, the considerable effort required by Clinical

Validation would need specific conditions now not available due to pandemic and subsequent limitations. For those reasons, the foreseen minimum goals can be summarized as follows:

- introducing a new methodology in psychosomatic diseases treatment;
- providing the design and the implementation of Vlad virtual reality software; and
- validating Vlad App as a software tool (see Section 3.5).

In addition to this, due to the pandemic and post-pandemic restrictions concerning Clinical premises and patients' access to them, the presented results (see Section 3.7) can only be referred to the early-stage testing phase and usability evaluation on a reduced sample of volunteers. In particular, two subjects/users accepted to be involved in the full usability and likeability evaluation step of Vlad as a software tool as described above. They belong both to healthy (1 user) and psychosomatic (1 as well, also matching inclusion criteria for Clinical validation) domains. The age of the participant was 21 for User #1 and 28 for User #2.

Both of the participants spontaneously adhered to the administration of the above-mentioned instruments and signed the Informed Consent (which is not included in compliance to privacy statements). The administration of the tools required forty minutes for each of the three sessions (initial/beginning, middle/after half a playing period named "Session 1", and final/after a full playing period named

“Session 2”). The participants fully addressed the required information, including an additional intermediate assessment at the end of the first set of Vlad training sessions (A') and the Computer Literacy Questionnaire.

Here follow the tables summarizing the volunteers' main results for the three administrations of the Likeability and User's Requirements questionnaires.

Table 1 and Table 2 show the Likeability questionnaire results for both users. In them, the qualitative approach turned into a quantitative one by operationalization. In this aim, the qualitative range (a little, enough, much) was mapped on a numerical range (1, 2, 3). This enables some interesting consideration on the answers to the questionnaire items.

Table 1 - Likeability questionnaire results for User #1.

	User #1 - Likeability	Before	Session 1	Session 2
<b>Q1</b>	Did you like using the App Vlad?	3	3	3
<b>Q2</b>	Did you feel comfortable using the App Vlad?	2	3	3
<b>Q3</b>	Were Vlad's instructions for use easy to understand?	2	3	3
<b>Q4</b>	Do you feel you have learnt new and interesting things?	2	2	3
<b>Q5</b>	Is there any aspect of Vlad that bothered you in the procedure or in the devices used?	2	1	1
<b>Q6</b>	Did you get tired sometimes?	2	1	1
<b>Q7</b>	Did you get bored sometimes?	1	1	1

<b>Q8</b>	Did Vlad seem to malfunction sometimes?	1	1	1
<b>Q9</b>	Do you sometimes get angry or sad?	1	2	3
<b>Q10</b>	Is there anything in particular that you didn't like about Vlad?	1	1	1
<b>Q11</b>	Did you have a headache or some physical discomfort at the end of the session?	1	1	1
<b>Q12</b>	Do you prefer Vlad's use to the tests done by giving answers on sheets of paper or by speaking to a doctor in person?	2	3	3
<b>Q13</b>	Would you come back to continue this experience in the future?	2	3	3
<b>Q14</b>	Would you propose to other people the use of Vlad for the improvement of creativity?	2	3	3

Table 2 - Likeability questionnaire results for User #2.

	User #2 - Likeability	Before	Session 1	Session 2
<b>Q1</b>	Did you like using the App Vlad?	2	3	3
<b>Q2</b>	Did you feel comfortable using the App Vlad?	2	3	3
<b>Q3</b>	Were Vlad's instructions for use easy to understand?	3	3	3
<b>Q4</b>	Do you feel you have learnt new and interesting things?	2	2	3
<b>Q5</b>	Is there any aspect of Vlad that bothered you	1	1	1

	in the procedure or in the devices to be used?			
<b>Q6</b>	Did you get tired sometimes?	1	1	1
<b>Q7</b>	Did you get bored sometimes?	1	1	1
<b>Q8</b>	Did Vlad seem to malfunction sometimes?	1	1	1
<b>Q9</b>	Do you sometimes get angry or sad?	1	1	2
<b>Q10</b>	Is there anything in particular that you didn't like about Vlad?	1	1	1
<b>Q11</b>	Did you have a headache or some physical discomfort at the end of the session?	1	1	1
<b>Q12</b>	Do you prefer Vlad's use to the tests done by giving answers on sheets of paper or by speaking to a doctor in person?	3	3	3
<b>Q13</b>	Would you come back to continue this experience in the future?	2	3	3
<b>Q14</b>	Would you propose to other people the use of Vlad for the improvement of creativity?	2	3	3

The following tables show the users' results for Patient's Requirement questionnaire in the three administrations.

Table 3 - Patient's Requirements questionnaire results for User #1.

	User #1 - Requirements	Before	Session 1	Session 2
<b>Q2.1</b>	If you had to take .. you have to answer some questions verbally	4	6	7

<b>Q2.2</b>	If you had to take .. you have to write the answer to some questions on sheet	2	2	3
<b>Q2.3</b>	If you had to take .. you have to answer some questions using some objects	3	5	5
<b>Q2.4</b>	If you had to take .. you have to listen to an audio and/or watch a video and then give an answer	6	7	7
<b>Q2.5</b>	If you had to take .. you need to answer some questions using a tablet or computer	5	8	10
<b>Q2.6</b>	If you had to take .. you have to play some kind of computer game	7	9	10
<b>Q3.1</b>	Would you like to .. Weekly frequency	1	2	3
<b>Q3.2</b>	Would you like to .. Monthly availability	1	2	6

Table 4 - Patient's Requirements questionnaire results for User #2.

	User #2 - Requirements	Before	Session 1	Session 2
<b>Q2.1</b>	If you had to take .. you have to answer some questions verbally	6	7	8
<b>Q2.2</b>	If you had to take .. you have to write the answer to some questions on sheet	4	3	3
<b>Q2.3</b>	If you had to take .. you have to answer some questions using some objects	6	4	6
<b>Q2.4</b>	If you had to take .. you have to listen to an audio and/or watch	4	5	4

	a video and then give an answer			
<b>Q2.5</b>	If you had to take .. you need to answer some questions using a tablet or computer	8	7	8
<b>Q2.6</b>	If you had to take .. you have to play some kind of computer game	8	9	10
<b>Q3.1</b>	Would you like to .. Weekly frequency	1	1	2
<b>Q3.2</b>	Would you like to .. Monthly availability	2	2	4

In order to simplify the understanding of the above-mentioned questions, some diagrams are shown in the following.

Figure 34, Figure 35, Figure 36, Figure 37 depict the trends of the values enlisted in Table 1, Table 2, Table 3, and Table 4, respectively. It is clear that the values provided in the three administrations of instruments have general positive trends and values do increase as the user's familiarity with the Vlad tool increases.

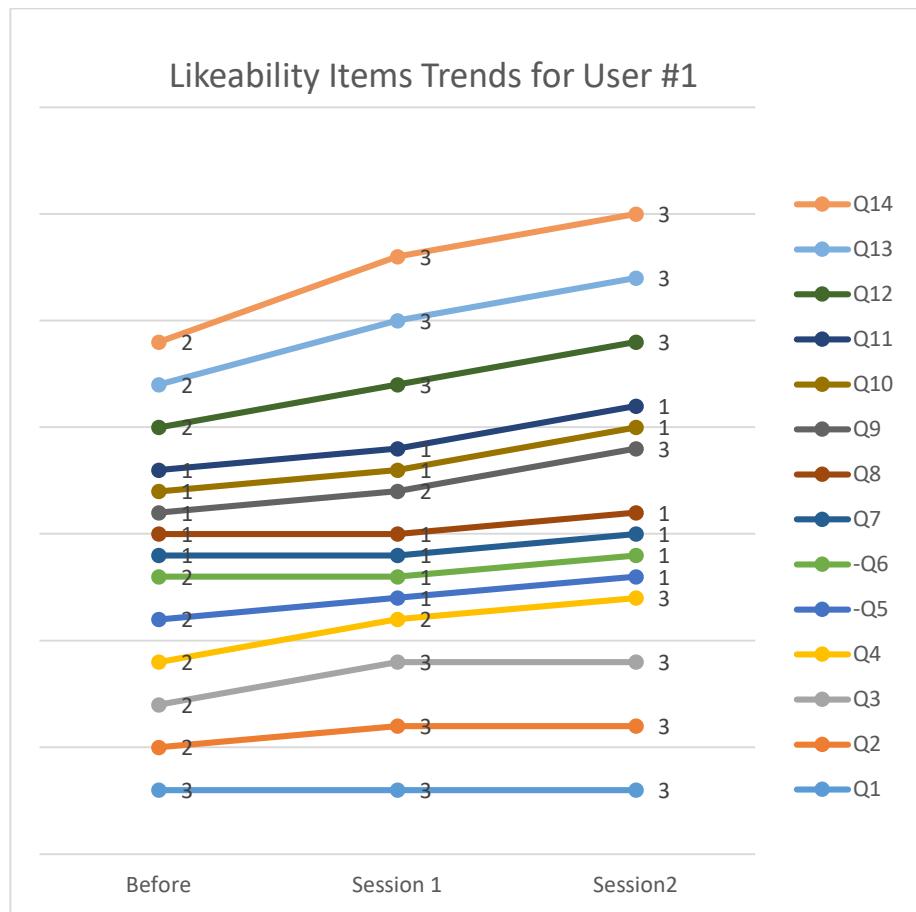


Figure 34 - Likeability Questionnaire item trends for User #1.

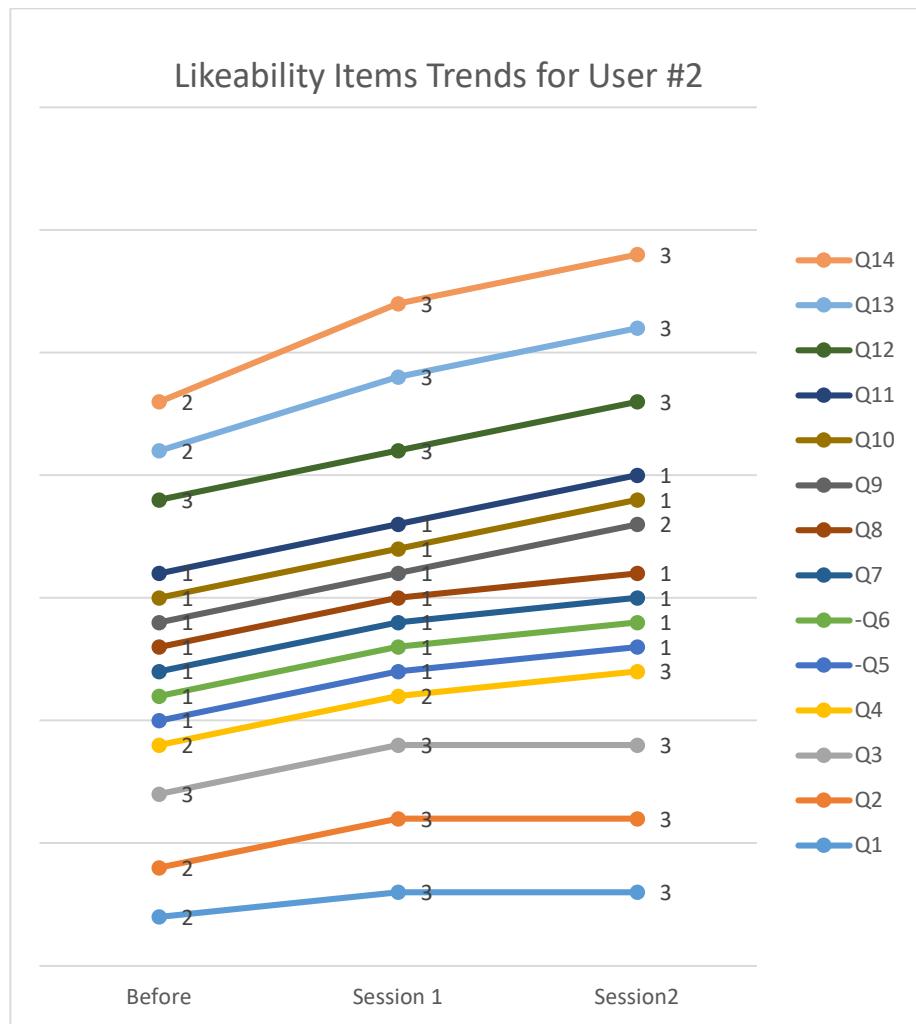


Figure 35 - Likeability Questionnaire item trends for User #2.

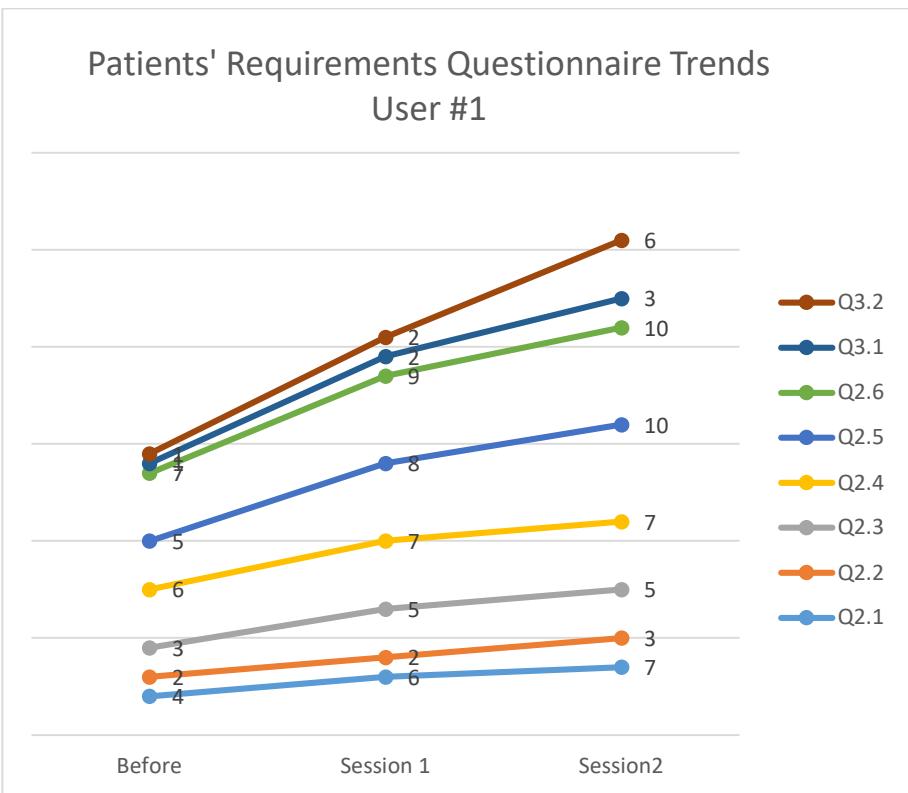


Figure 36 - Patient's Requirements Questionnaire item trends for User #1.

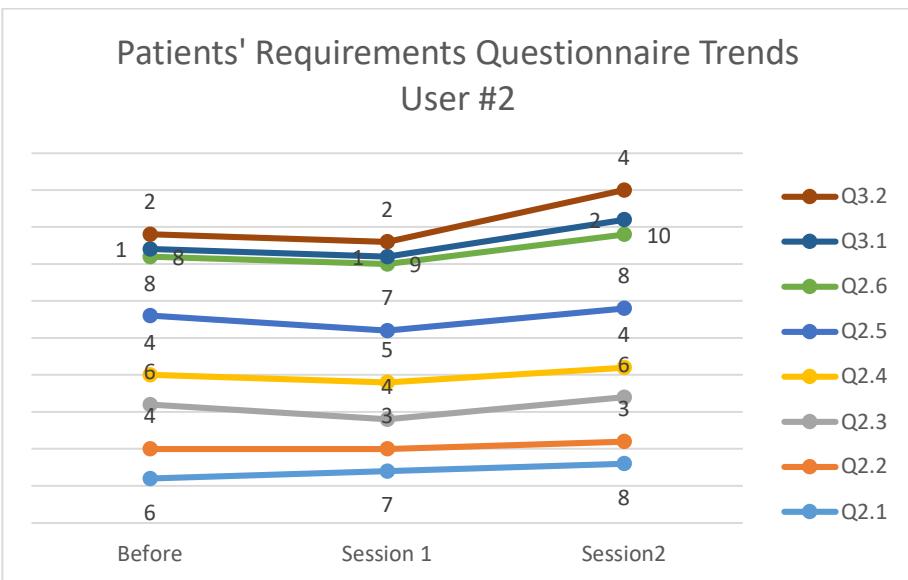


Figure 37 - Patient's Requirements Questionnaire item trends for User #2.

It can be easily stated that the parameters chosen to estimate the likeability and the usability of Vlad generally tend to optimum (maximum) values when the number of sessions administered increases. The few case of misalignment with this general statement will be discussed in the next section.

## Chapter Four. Conclusions.

### 4.1 Results analysis and Conclusions

The data presented in Section 3.7 enable several interesting conclusions on the perceptions the users have of the new technological tool and how the use of Vlad opens a path towards an increased acceptance of an innovative approach in training/rehabilitation.

Based on data presented (see Table 1, Table 2, Table 3, and Table 4) and the trends (see Figure 34, Figure 35, Figure 36, and Figure 37) it is quite easy to state that the general acceptance of the Vlad software and devices increases with the user experience. In fact, it is possible to look at the set of the administered sessions as they were parts of a unique learning process where the familiarity in using Vlad is the independent variable. Obviously, especially for users in the age range targeted by this research project, (serious) gaming in either 2D or 3D space is a kind of object manipulation activity, whatever the controller or the gamepad used be, where familiarity and move speed/frequency increase with time since experience in using devices is the main driving factor. By adopting a system engineering approach, the user can be (exceptionally) seen as a *system*, a black box whose internal behaviour is not known and not monitored. In order to evaluate the process of validating Vlad as a software, in this approach, it simply necessary to evaluate the trend and changes in system outputs. In this research, as it is visible in

the questionnaire, the output is evaluated in terms of the following factors:

- matching of existing expectations and rising of new ones by the user;
- feelings and perceptions regarding the eventual discomfort of using Vlad;
- willingness to prolong the user experience with Vlad.

In order to optimize the analysis, it is fundamental to categorize the learning process in two separated time intervals:

- the *transient* phase, starting for this study with the initial assessment and lasting until the end of the first training session (Session 1); in our case study, the transient (namely a transitory, impermanent period) is usually the time when the system faces new stimuli/inputs for the first times; in the transient the system loses its initial equilibrium conditions due to stimuli and slowly operates seeking for new equilibrium conditions; in learning process, during the transient phase knowledge and skills improve more rapidly since it represents the time where new problems are faced, corresponding knowledge is acquired day-by-day, and new competences start to be built by the user running the first sessions with Vlad; the transient ends when a new equilibrium is reached and the system adapted to the new stimuli and has the necessary knowledge and competences to reach an acceptable output/performance levels; in our research

the intermediate assessment was administered at the end of the transient phase;

- the *operational regime* phase, starting from the end of the transient, is when the system properly reacts to stimuli and is often able to improve general performances in time, towards the maximum theoretical outcomes; in this research, it represents the phase where the user autonomously interacts with the Vlad system, involvement starts, and he/she is able to formulate his/her new expectations and requirements; at that point the user knows how to deal with the software and related hardware, and the creativity increases since the user is more focused on the task and not on the system.

It is important to highlight that reaching a new equilibrium at the end of the transient does not imply that the equilibrium conditions (either system performance or system internal metrics and parameters we are currently ignoring) are better than the initial ones. Correspondingly system performances could even be worse than initial ones, as well. From the research point of view, facing Vlad system for the first time puts the user in a stressful situation, where he/she experiments initial difficulties in simple manipulation activities, which makes usual actions and moves in virtual reality slower and less precise than in the real conditions. For this reason, some patients, who are less able to recover from stressful conditions, tend to provide worse values in replying to some intermediate assessment items. This is acceptable in the aim of the current analysis, if the depreciation is limited

to few distress-related values while the trend of remaining items is generally positive, especially if there is a minimum change between initial and intermediate values.

In ethical terms, it should also be provided a statement concerning the possibility to experience low levels of distress, in order to be adherent to ethical practices and to inform the patient about possible outcomes.

During the software validation phase, it must be noted that the User #1 values did not express any depreciation between initial and intermediate assessment. For User #2, three main values highlighted minor depreciation. With reference to Q2.2 and Q2.3, the values are not referred to items strictly concerning Vlad issues. They are in fact general, in terms of question answering, so that the subject answered with reference to often occurring situations in real life. With regard to Q2.5 the values can be considered as guarantors of subject-Vlad interaction. The scores remain high, suggesting the maintenance of interest and low effect of distress.

Following the three main figures will be compared with the obtained trends.

Matching of existing expectations and rising of new ones by the user: the increment of the values represent an improvement of creativity, expectations towards Vlad, self-confidence and a higher interest for experience rather than interaction with devices.

Feelings and perceptions regarding the eventual discomfort of using Vlad: weakness decreased due to higher familiarity with the Vlad system. The only issue was referred to the User

#2, who experienced headache even if the subject suggested recurrent headache episodes within anamnesis.

Willingness to prolong the user experience with Vlad: it is also demonstrated by the increasing willingness stated by the users to keep using Vlad for their training activities. The valuable element in the interviews is the common statement regarding the availability to attend the sessions with higher frequency for a substantially longer period.

Taking into account Likeability and Usability, the assessment instruments showed that an increasing number of sessions corresponded to an increase of tolerance, acceptance, involvement and likability.

Finally, the results obtained suggested a considerable level of effectiveness and usability, that encourages the rigorous subsequent experimentation in compliance with the above-mentioned research design.

## Bibliography

1. Aarne, Antti 1910: Verzeichnis der Märchenotypen. Helsinki.
2. Addis, D. R., Wong, A. T., & Schacter, D. L. (2007). Remembering the past and imagining the future: Common and distinct neural substrates during event construction and elaboration. *Neuropsychologia*, 45(7), 1363–1377
3. Alessandri, G., Vecchione, M., Caprara, G., & Letzring, T. D. (2011). The ego resiliency scale revised. *European Journal of Psychological Assessment*.
4. Anatoly Liberman. Manchester:Manchester University Press.
5. Andrews, G., Pollock, C., & Stewart, G. (1989). The determination of defense style by questionnaire. *Archives of general psychiatry*, 46(5), 455-460.
6. Arnes's Verzeichnis der Märchentypen translated and enlarged. Helsinki.
7. Bagby, R. M., Parker, J. D., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale—I. Item selection and cross-validation of the factor structure. *Journal of psychosomatic research*, 38(1), 23-32.
8. Bal, Mieke, 1985:Narratology:Introduction to the Study of Narrative. Toronto: University of
9. Barsky, A. J., Orav, E. J., & Bates, D. W. (2005). Somatization increases medical utilization and costs independent of psychiatric and medical comorbidity. *Archives of general psychiatry*, 62(8), 903-910.

10. Bauer, A. M., Bonilla, P., Grover, M. W., Meyer, F., Riselli, C., & White, L. (2011). The role of psychosomatic medicine in global health care. *Current psychiatry reports*, 13(1), 10-17.
11. Bauman, Richard 1986:Story, performance, and event. Cambridge.
12. Berger, Arthur Asa 1997: Narratives in Popular Culture, Media, and Everyday Life.
13. Berger, Arthur Asa 2002: Video Games: A Popular Culture Phenomenon. New
14. Berney, S., Roten, Y., Beretta, V., Kramer, U., & Despland, J. N. (2014). Identifying psychotic defenses in a clinical interview. *Journal of clinical psychology*, 70(5), 428-439.
15. Block, J., & Kremen, A. M. (1996). IQ and ego-resiliency: conceptual and empirical connections and separateness. *Journal of personality and social psychology*, 70(2), 349.
16. Bodenheimer, T., Lorig, K., Holman, H., & Grumbach, K. (2002). Patient self-management of chronic disease in primary care. *Jama*, 288(19), 2469-2475.
17. Bond, M. P., & Vaillant, J. S. (1986). An empirical study of the relationship between diagnosis and defense style. *Archives of General Psychiatry*, 43(3), 285-288.
18. Bond, M., Gardner, S. T., Christian, J., & Sigal, J. J. (1983). Empirical study of self-rated defense styles. *Archives of general psychiatry*, 40(3), 333-338.

19. Boring, E. G. (1954). The nature and history of experimental control. *The American Journal of Psychology*, 67(4), 573-589.
20. Boring, E. G. (1969). Perspective: Artifac and control, in R. Rosenthal e R. L. Rosnow, *Artifac in behavioral research*, New York, Academic Press.
21. Borkovec, T. D., Lyonfields, J. D., Wiser, S. L., & Deihl, L. (1993). The role of worrisome thinking in the suppression of cardiovascular-response to phobic imagery. *Behaviour Research and Therapy*, 31(3), 321–324.
22. Bressi, C., Taylor, G., Parker, J., Bressi, S., Brambilla, V., Aguglia, E., ... & Todarello, O. (1996). Cross validation of the factor structure of the 20-item Toronto Alexithymia Scale: an Italian multicenter study. *Journal of psychosomatic research*, 41(6), 551-559.
23. Brewer, W. F. (1996). What is recollective memory? In D. C. Rubin (Ed.), *Remembering Our Past. Studies in Autobiographical Memory* (pp. 19–66). Cambridge: Cambridge University Press.
24. Brunswick: Transaction Publishers.
25. Busch, F. N. (2014). Clinical approaches to somatization. *Journal of clinical psychology*, 70(5), 419-427.
26. Campbell, Joseph 1993 (1949): *The Hero with a Thousand Faces*. London:Fontana Press.
27. Caprara, G. V., Alessandri, G., & Barbaranelli, C. (2010). Optimal functioning: Contribution of self-

- efficacy beliefs to positive orientation. *Psychotherapy and psychosomatics*, 79(5), 328.
28. Caprara, M., Steca, P., & De Leo, G. (2003). La misura dell'ego-resiliency. *Ricerche di psicologia*.
  29. Caretti, V., Porcelli, P., Solano, L., Schimmenti, A., Bagby, R. M., & Taylor, G. J. (2011). Reliability and validity of the Toronto Structured Interview for Alexithymia in a mixed clinical and nonclinical sample from Italy. *Psychiatry research*, 187(3), 432-436.
  30. Carrozzino, D., & Porcelli, P. (2018). Alexithymia in gastroenterology and hepatology: a systematic review. *Frontiers in psychology*, 9, 470.
  31. Chida, Y., & Steptoe, A. (2008). Positive psychological well-being and mortality: a quantitative review of prospective observational studies. *Psychosomatic medicine*, 70(7), 741-756.
  32. Chida, Y., & Steptoe, A. (2009). The association of anger and hostility with future coronary heart disease: a meta-analytic review of prospective evidence. *Journal of the American college of cardiology*, 53(11), 936-946.
  33. Clark, A. (1999). *Dare corpo alla mente*. McGraw-Hill.
  34. Conway, M. A., & Holmes, E. A. (2005). Autobiographical memory and the working self. In N. R. Braisby, & A. R. H. Gellatly (Eds.), *Cognitive Psychology* (pp. 507–538). Oxford: Oxford University Press.
  35. Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-

- memory system. *Psychological Review*, 107(2), 261–288.
36. Cook, T. D., Campbell, D. T., & Peracchio, L. (1990). Quasi experimentation. MD Dunnette, LM Hough, eds. *Handbook of Industrial & Organizational Psychology*.
  37. Cramer, P. (1991). The development of defense mechanisms: Theory, research and discussion of the scales. New York7 Springer-Verlag.
  38. Craparo, G., Faraci, P., & Gori, A. (2015). Psychometric properties of the 20-item Toronto Alexithymia Scale in a group of Italian younger adolescents. *Psychiatry investigation*, 12(4), 500.
  39. Creed, F., Tomenson, B., Chew-Graham, C., Macfarlane, G., & McBeth, J. (2018). The associated features of multiple somatic symptom complexes. *Journal of psychosomatic research*, 112, 1-8.
  40. De Burge, A. (2001). La levèe de la suppression en psicosomatiquè. *Revue française de psychanalys*, vol 1, 11-27.
  41. De Waal, M. W., Arnold, I. A., Spinhoven, P., Eekhof, J. A., Assendelft, W. J., & van Hemert, A. M. (2009). The role of comorbidity in the detection of psychiatric disorders with checklists for mental and physical symptoms in primary care. *Social Psychiatry and Psychiatric Epidemiology*, 44(1), 78-85.
  42. Dechaud-Ferbus, M. (2009). Les inhibiteurs de l'excitation dans la genèse du fonctionnement

- psychique: de la décharge à la liaison. *Revue française de psychanalyse*, 73(2), 331-347.
43. Dundes, Alan 1964: The Morphology of North American indian tales. Helsinki:Suomalainen
  44. Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, 38(4), 319–345.
  45. Engel, G. L. (1967). The concept of psychosomatic disorder. *Journal of Psychosomatic Research*, 11(1), 3-9.
  46. Engel, G. L. (1977). The need for a new medical model: a challenge for biomedicine. *Science*, 196(4286), 129-136.
  47. Eriksson, M., & Lindström, B. (2006). Antonovsky's sense of coherence scale and the relation with health: a systematic review. *Journal of epidemiology & community health*, 60(5), 376-381.
  48. Farma, T., & Cortinovis, I. (2000). Misurare i meccanismi di difesa attraverso il “Defense Style Questionnaire” a 40 item. Attendibilità dello strumento e suo utilizzo nel contesto italiano. *Ric. Psicol*, 24, 127-144.
  49. Fava, G. A., Belaise, C., & Sonino, N. (2010). Psychosomatic medicine is a comprehensive field, not a synonym for consultation liaison psychiatry. *Current psychiatry reports*, 12(3), 215-221.
  50. Fava, G. A., Freyberger, H. J., Bech, P., Christodoulou, G., Sensky, T., Theorell, T., & Wise, T. N. (1995).

- Diagnostic criteria for use in psychosomatic research.  
*Psychotherapy and psychosomatics*, 63(1), 1-8.
51. Fava, G. A., Guidi, J., Semprini, F., Tomba, E., & Sonino, N. (2010). Clinical assessment of allostatic load and clinimetric criteria. *Psychotherapy and Psychosomatics*, 79(5), 280-284.
  52. Ferrari, S., Galeazzi, G. M., Mackinnon, A., & Rigatelli, M. (2008). Frequent attenders in primary care: impact of medical, psychiatric and psychosomatic diagnoses. *Psychotherapy and psychosomatics*, 77(5), 306-314.
  53. Freeman D, Bradley J, Antley A et al. *Br J Psychiatry* 2016;209:62-7. [PubMed]
  54. Fresco, D. M., Frankel, A. N., Mennin, D. S., Turk, C. L., & Heimberg, R. G. (2002). Distinct and overlapping features of rumination and worry: The relationship of cognitive production to negative affective states. *Cognitive Therapy and Research*, 26(2), 179–188.
  55. Freud, A. (1936/1937) The ego and the mechanisms of defense, trans. C. Baines. International Universities Press.
  56. Freud, S. (1898). L'interpretazione dei sogni. Opere, vol.3. Boringhieri.
  57. Freud, S. (1926). Inhibitions, symptoms and anxiety SE 20 [→].
  58. Freud, S. (1926). Inibizione, sintomo e angoscia, OSF, vol. 10. Bollati Boringhieri, Torino.
  59. Freud, S. (2013). Inibizione, sintomo e angoscia. Bollati Boringhieri.

60. Freud, S., & Cronin, A. J. (2013). *The interpretation of dreams*. Read Books Ltd.
61. Galeazzi, G. M., Ferrari, S., Mackinnon, A., & Rigatelli, M. (2004). Interrater reliability, prevalence, and relation to ICD-10 diagnoses of the Diagnostic Criteria for Psychosomatic Research in consultation-liaison psychiatry patients. *Psychosomatics*, 45(5), 386-393.
62. Gierk, B., Kohlmann, S., Kroenke, K., Spangenberg, L., Zenger, M., Brähler, E., & Löwe, B. (2014). The somatic symptom scale-8 (SSS-8): a brief measure of somatic symptom burden. *JAMA internal medicine*, 174(3), 399-407.
63. Grandi, S., Fabbri, S., Tossani, E., Mangelli, L., Branzi, A., & Magelli, C. (2001). Psychological evaluation after cardiac transplantation: the integration of different criteria. *Psychotherapy and psychosomatics*, 70(4), 176-183.
64. Grassi, L., Sabato, S., Rossi, E., Biancosino, B., & Marmai, L. (2005). Use of the diagnostic criteria for psychosomatic research in oncology. *Psychotherapy and psychosomatics*, 74(2), 100-107.
65. Green A. (1993), *Le travail du négatif*, Paris, Éd. de Minuit.
66. Greimas, A.-J. 1983 (1966): *Structural Semantics: An Attempt at a Method*. Lincoln:U of
67. Hackmann, A., & Holmes, E. A. (2004). Reflecting on imagery: A clinical perspective and overview of the special edition on mental imagery and memory in psychopathology. *Memory*, 12(4), 389–402.

68. Hart, J. T. (1995). Clinical and economic consequences of patients as producers. *Journal of Public Health*, 17(4), 383-386.
69. Herbart, J. F. (1824). Psychologie als Wissenschaft, neu gegründet auf Erfahrung, Metaphysik und Mathematik. 2 Bände. Königsberg: Unzer.
70. Herbart, J. F. (1825). Lehrbuch zur Psychologie (1816). Psychologie als Wissenschaft.
71. Hinz, A., Ernst, J., Glaesmer, H., Brähler, E., Rauscher, F. G., Petrowski, K., & Kocalevent, R. D. (2017). Frequency of somatic symptoms in the general population: Normative values for the Patient Health Questionnaire-15 (PHQ-15). *Journal of psychosomatic research*, 96, 27-31.
72. Hirsch, C. R., & Holmes, E. A. (2007). Mental imagery in anxiety disorders. *Psychiatry*, 6(4), 161–165.
73. Hobson, J. A. (2018). Ego Damage and Repair: Toward a Psychodynamic Neurology. Routledge.
74. Holbek, Bengt 1986: Interpretation of Fairy Tales. Helsinki: Suomalainen Tiedeakatemia.
75. Holmes, E. A., & Mathews, A. (2005). Mental imagery and emotion: A special relationship? *Emotion*, 5(4), 489–497.
76. Holmes, E. A., Arntz, A., & Smucker, M. R. (2007). Imagery rescripting in cognitive behaviour therapy: Images, treatment techniques and outcomes. *Journal of Behavior Therapy and Experimental Psychiatry*, 38(4), 297–305.

77. Husserl Edmund. (1911). “Philosophie als strenge Wissenschaft”, in: Logos; trad. it.: La filosofia come scienza rigorosa, Laterza, Bari, 2005, 3-4
78. Ivarsson, T., & Valderhaug, R. (2006). Symptom patterns in children and adolescents with obsessive-compulsive disorder (OCD). *Behaviour Research and Therapy*, 44(8), 1105-1116.
79. Jaspers k. (1957). Philosophische Autobiographie. Stuggard: Kohlnhammer (trad. It. Autobiografia filosofica. Napoli : Morano, 1969).
80. Jaspers k. (1959). Allgemeine Psychopathologie. Berlin : Springer (VII ed ;I ed 1913) (trad. it. Psicopatologia Generale, Roma: Il pensiero scientifico, 1964).
81. Jaspers Karl (1912). Die phanomenologische Forschungsrichtung in der Psychopathologie. *Z.Neur* 9, 391.
82. Joustra, M. L., Janssens, K. A., Schenk, H. M., & Rosmalen, J. G. (2018). The four week time frame for somatic symptom questionnaires reflects subjective symptom burden best. *Journal of psychosomatic research*, 104, 16-21.
83. Kahn L., (2001). L'action de la forme. *Rev. Franc. Psychanal*, vol.1, 983-1056
84. Kano, M., Endo, Y., & Fukudo, S. (2018). Association between alexithymia and functional gastrointestinal disorders. *Frontiers in psychology*, 9, 599.
85. Kavanagh, D. J., Andrade, J., & May, J. (2005). Imaginary relish and exquisite torture: The elaborated

- intrusion theory of desire. *Psychological Review*, 112(2), 446–467.
86. Kidd, T., & Sheffield, D. (2005). Attachment style and symptom reporting: Examining the mediating effects of anger and social support. *British Journal of Health Psychology*, 10(4), 531-541.
  87. KISSEN, D. M. (1963). The significance of syndrome shift and late syndrome association in psychosomatic medicine. *The Journal of nervous and mental disease*, 136(1), 34-42.
  88. Kohlmann, S., Gierk, B., Hilbert, A., Brähler, E., & Löwe, B. (2016). The overlap of somatic, anxious and depressive syndromes: A population-based analysis. *Journal of psychosomatic research*, 90, 51-56.
  89. Kohlmann, S., Gierk, B., Hümmelgen, M., Blankenberg, S., & Löwe, B. (2013). Somatic symptoms in patients with coronary heart disease: prevalence, risk factors, and quality of life. *JAMA internal medicine*, 173(15), 1469-1471.
  90. Körber, S., Frieser, D., Steinbrecher, N., & Hiller, W. (2011). Classification characteristics of the Patient Health Questionnaire-15 for screening somatoform disorders in a primary care setting. *Journal of psychosomatic research*, 71(3), 142-147.
  91. Kosslyn, S. M. (2005). Reflective thinking and mental imagery: A perspective on the development of posttraumatic stress disorder. *Development and Psychopathology*, 17(3), 851–863.

92. Kroenke, K., Jackson, J. L., & Judith Chamberlin PA, M. P. H. (1997). Depressive and anxiety disorders in patients presenting with physical complaints: clinical predictors and outcome. *The American journal of medicine*, 103(5), 339-347.
93. Kroenke, K., Spitzer, R. L., & Williams, J. B. (2002). The PHQ-15: validity of a new measure for evaluating the severity of somatic symptoms. *Psychosomatic medicine*, 64(2), 258-266.
94. Kyrou, I., Kollia, N., Panagiotakos, D., Georgousopoulou, E., Chrysohoou, C., Tsigos, C., ... & Pitsavos, C. (2017). Association of depression and anxiety status with 10-year cardiovascular disease incidence among apparently healthy Greek adults: The ATTICA Study. *European journal of preventive cardiology*, 24(2), 145-152.
95. Lange K. (1899), Über Apperzeption. Eine psychologisch-pädagogische Monographie, Plauen, F.E. Neupert, 1895.
96. LeDoux, J. E. (2000). Emotion circuits of the brain. *Annual Review of Neuroscience*, 23, 155–184
97. Levi-Strauss, Claude 1984: Structure and Form:Reflections on a Work by Vladimir Propp. In Propp 1984 pp 167-189.
98. Li, L., Peng, T., Liu, R., Jiang, R., Liang, D., Li, X., ... & Zhang, J. (2020). Development of the psychosomatic symptom scale (PSSS) and assessment of its reliability and validity in general hospital patients in China. *General Hospital Psychiatry*, 64, 1-8.

99. Lingiardi V., Madeddu F., (1994). I meccanismi di difesa. Teoria clinica e ricerca empirica. Raffaello Cortina Editore.
100. Lipowski, Z. J. (1986). Psychosomatic medicine: Past and present: II. Current state. *The Canadian Journal of Psychiatry/La Revue canadienne de psychiatrie*.
101. Löwe, B., Spitzer, R. L., Williams, J. B., Mussell, M., Schellberg, D., & Kroenke, K. (2008). Depression, anxiety and somatization in primary care: syndrome overlap and functional impairment. *General hospital psychiatry*, 30(3), 191-199.
102. M. Fain et P. Marty, Contribution à l'étude des rachialgies par l'examen psychodynamique des malades, *Évolution psychiatrique*, no 1, 1952.
103. M. Fain et P. Marty, Contribution à l'étude des rachialgies par l'examen psychodynamique des malades, *Évolution psychiatrique*, no 1, 1952.
104. M. Fain et P. Marty, Importance de la motricité dans la relation d'objet, *Revue française de psychanalyse*, 1955, no 1-2
105. M. Fain et P. Marty, Importance de la motricité dans la relation d'objet, *Revue française de psychanalyse*, 1955, no 1-2
106. Mangelli, L., Semprini, F., Sirri, L., Fava, G. A., & Sonino, N. (2006). Use of the Diagnostic Criteria for Psychosomatic Research (DCPR) in a community sample. *Psychosomatics*, 47(2), 143-146.

107. McEwen, B. S. (2007). Physiology and neurobiology of stress and adaptation: central role of the brain. *Physiological reviews*, 87(3), 873-904.
108. McEwen, B. S., & Stellar, E. (1993). Stress and the individual: mechanisms leading to disease. *Archives of internal medicine*, 153(18), 2093-2101.
109. McKay, D., Piacentini, J., Greisberg, S., Graae, F., Jaffer, M., & Miller, J. (2006). The structure of childhood obsessions and compulsions: dimensions in an outpatient sample. *Behaviour Research and Therapy*, 44(1), 137-146.
110. Meletenskij, Elassar m fl 1974: Problems of the structural analysis of fairytales. In Maranda, Pierre (ed): Soviet Structural folkloristics, The Hague/Paris, pp 73-139.
111. Metzger, J. A. (2014). Adaptive defense mechanisms: function and transcendence. *Journal of clinical psychology*, 70(5), 478-488.
112. Miers, A. C., Rieffe, C., Terwogt, M. M., Cowan, R., & Linden, W. (2007). The relation between anger coping strategies, anger mood and somatic complaints in children and adolescents. *Journal of Abnormal Child Psychology*, 35(4), 653-664.
113. Mills, Margaret 1991: Rhetorics and politics in Afghan traditional storytelling. Philadelphia: University of Pennsylvania Press.
114. Nakamura, S., Kato, K., Yoshida, A., Fukuma, N., Okumura, Y., Ito, H., & Mizuno, K. (2013). Prognostic value of depression, anxiety, and anger in hospitalized

- cardiovascular disease patients for predicting adverse cardiac outcomes. *The American journal of cardiology*, 111(10), 1432-1436.
115. Novack, D. H., Cameron, O., Epel, E., Ader, R., Waldstein, S. R., Levenstein, S., ... & Wainer, A. R. (2007). Psychosomatic medicine: the scientific foundation of the biopsychosocial model. *Academic Psychiatry*, 31(5), 388-401.
116. Öhman, A., & Mineka, S. (2001). Fears, phobias, and preparedness: Toward an evolved module of fear and fear learning. *Psychological Review*, 108(3), 483–522.
117. Okuda, J., Fujii, T., Ohtake, H., Tsukiura, T., Tanji, K., Suzuki, K., et al. (2003). Thinking of the future and past: The roles of the frontal pole and the medial temporal lobes. *NeuroImage*, 19(4), 1369–1380
118. Otterpohl, N., Stranghoener, D., Vierhaus, M., & Schwinger, M. (2017). Anger regulation and school-related somatic complaints in children with special educational needs: a longitudinal study. *Learning and Individual Differences*, 56, 59-67.
119. Parsons TD, Carlew AR, Magtoto J et al. *Neuropsychol Rehabil* 2015;11:1-31.
120. Penot B. (2001). Reprimer, idealiser, subbliminar. *Rev Frenc Psychanal.*, vol. 1, 71-83.
121. Perry, J. C. (1990). *The Defense Mechanisms Rating Scales Manual* (5th ed.). Boston: The Cambridge Hospital.
122. Picardi, A., & Abeni, D. (2001). Stressful life events and skin diseases: disentangling evidence from

- myth. *Psychotherapy and psychosomatics*, 70(3), 118-136.
123. Picardi, A., Porcelli, P., Pasquini, P., Fassone, G., Mazzotti, E., Lega, I., ... & Fava, G. A. (2006). Integration of multiple criteria for psychosomatic assessment of dermatological patients. *Psychosomatics*, 47(2), 122-128.
124. Porcelli, P., & Rafanelli, C. (2010). Criteria for psychosomatic research (DCPR) in the medical setting. *Current psychiatry reports*, 12(3), 246-254.
125. Porcelli, P., & Sonino, N. (Eds.). (2007). Psychological factors affecting medical conditions: A new classification for DSM-V (Vol. 28). Karger Medical and Scientific Publishers.
126. Porcelli, P., Bellomo, A., Quartesan, R., Altamura, M., Iuso, S., Ciannameo, I., ... & Elisei, S. (2009). Psychosocial functioning in consultation-liaison psychiatry patients: influence of psychosomatic syndromes, psychopathology and somatization. *Psychotherapy and psychosomatics*, 78(6), 352-358.
127. Porcelli, P., De Carne, M., & Fava, G. A. (2000). Assessing somatization in functional gastrointestinal disorders: integration of different criteria. *Psychotherapy and psychosomatics*, 69(4), 198-204.
128. Pot-Kolder R, Veling W, Geraets C et al. Trials 2016;17:25. [PubMed]
129. Propp, Vladimir 1968: Morphology of the Folktale. First edition translated by Laurence Scott with an Introduction by Svatava Pirkova-Jakobson; 2nd edition

revised and edited with a Preface by Louis A.Wagner/New Introduction by Alan Dundes. Austin:University of Texas Press.

130. Propp, Vladimir 1984: Theory and History of Folklore. Translated by Ariadna Y. Martin and
131. Rafanelli, C., Roncuzzi, R., & Milaneschi, Y. (2006). Minor depression as a cardiac risk factor after coronary artery bypass surgery. *Psychosomatics*, 47(4), 289-295.
132. Rafanelli, C., Roncuzzi, R., Finos, L., Tossani, E., Tomba, E., Mangelli, L., ... & Fava, G. A. (2003). Psychological assessment in cardiac rehabilitation. *Psychotherapy and Psychosomatics*, 72(6), 343-349.
133. Richard P. Martin, and several others: Edited, with an Introduction and Notes, by
134. Romans, S., & Cohen, M. (2008). Unexplained and underpowered: the relationship between psychosomatic disorders and interpersonal abuse—a critical review. *Harvard review of psychiatry*, 16(1), 35-54.
135. Rooth, Anna Birgitta 1951:The Cinderella Cycle. Lund:Gleerups.
136. Rorschach, Hermman (1921). Psychodiagnostics. Tr. It Psicodiagnostica. Roma. Kappa 1981.
137. Rozanski, A., Blumenthal, J. A., & Kaplan, J. (1999). Impact of psychological factors on the pathogenesis of cardiovascular disease and implications for therapy. *Circulation*, 99(16), 2192-2217.
138. Rus-Calafell M, Gutierrez-Maldonado J, Ribas-Sabate J. J Behav Ther Exp Psychiatry 2014;45:81-9. [PubMed]

139. Russian Formalist Criticism:Four essays, Lincoln, U of Nebraska Press.
140. Ryff, C. D., & Singer, B. (1996). Psychological well-being: Meaning, measurement, and implications for psychotherapy research. *Psychotherapy and psychosomatics*, 65(1), 14-23.
141. S. Freud, Zur Auffassung der Aphasien. Eine kritische Studie, tr. it. di L. Longato, L'interpretazione delle afasie, Sugarco, Milano 1989, p. 142
142. San Tse, P., González, D. A., & Jenkins, S. R. (2018). Validating the structure of the depression and somatic symptoms scale. *Psychosomatics*, 59(3), 277-282.
143. Sartre, J. P. (2007), L'immaginario: psicologia fenomenologica dell'immaginazione. Einaudi.
144. Schacter, D. L., Addis, D. R., & Buckner, R. L. (2007). Remembering the past to imagine the future: The prospective brain. *Nature Reviews: Neuroscience*, 8(Sept), 657–661
145. Schmitz, N., Hartkamp, N., Franz, M., Buse, S., Karig, R., & Tress, W. (2002). Properties of the Symptom Check List (SCL-90-R) in a psychosomatic consultation-liaison setting. *Psychological reports*, 90(3\_part\_2), 1201-1207.
146. Schmitz, N., Hartkamp, N., Kiuse, J., Franke, G. H., Reister, G., & Tress, W. (2000). The symptom checklist-90-R (SCL-90-R): a German validation study. *Quality of Life Research*, 9(2), 185-193.
147. Settineri S., Lo studio dei complessi nei reattivi proiettivi: dalla psicologia oggettiva alla psicologia

- soggettiva come pratica clinica. Pp 75 in: Sola, T. (2015) (Ed.), Psicologia clinica e psicoanalisi: tra diagnosi e terapia. Attualità in campo proiettivo. Gaia s.r.l. - Edizioni Universitarie Romane.
148. Settineri, S., & Merlo, E. M. (2019). The Phenomenology of the Style of Existence in Gender Dysphoric Patients. A Bridge Between Apperception and Body Memory. *Reti, saperi, linguaggi*, 6(1), 171-194.
149. Settineri, S., Frisone, F., Alibrandi, A., & Merlo, E. M. (2019). Emotional suppression and oneiric expression in psychosomatic disorders: early manifestations in emerging adulthood and young patients. *Frontiers in psychology*, 10, 1897.
150. Settineri, S., Merlo, E. M., Dritto, I. P., Midili, M., Bruno, A., & Mento, C. (2016). Suppression mental questionnaire: a preliminary study. *Mediterranean Journal of Clinical Psychology*, 4(2).
151. Settineri, S., Merlo, E. M., Turiaco, F., & Mento, C. (2018). Les organes endommagés dans la constitution de l'image de l'esprit. *L'Évolution Psychiatrique*, 83(2), 333-342.
152. Sidman, M. (1960). Tactics of scientific research.
153. Sidman, M. (1988). *Tactics of scientific research: Evaluating experimental data in psychology*, Boston, MA, Authors Cooperative.
154. Sonino, N., Ruini, C., Navarrini, C., Ottolini, F., Sirri, L., Paoletta, A., ... & Fava, G. A. (2007). Psychosocial impairment in patients treated for pituitary disease: a

- controlled study. Clinical endocrinology, 67(5), 719-726.
155. Sonino, N., Tomba, E., & Fava, G. A. (2007). Psychosocial approach to endocrine disease. In Psychological factors affecting medical conditions (Vol. 28, pp. 21-33). Karger Publishers.
156. Stopa, L. (Ed.). (2009). Imagery and the threatened self: Perspectives on mental imagery and the self in cognitive therapy, 1st ed. Hove: Routledge.
157. Stout G.F. (1896), Analytic Psychology, vol. 1, London, Swan Sonnenschein.
158. Stout, G. F. (1896), Analytic Psychology, bk. ii. Ch. Viii, London.
159. Szpunar, K. K., Watson, J. M., & McDermott, K. B. (2007). Neural substrates of envisioning the future. Proceedings of the National Academy of Science, 104(2), 642–647.
160. Szwec, G. (2018). The capacity to say no and psychosomatic disorders in childhood. In Psychosomatics Today (pp. 163-179). Routledge.
161. Tapp, J., Cottle, L., Christmas, M., Stratton, R., Gannon, T. A., & Moore, E. (2018). A psychometric evaluation of the Defence Style Questionnaire-40 in a UK forensic patient population. The Journal of Forensic Psychiatry & Psychology, 29(2), 288-307.
162. Thompson, S., 1961: The types of the Folktale:A Classification and Bibliography.
163. Tomashevski, B., 1965 (1925):Thematics. In: Lemon, Lee T & Marion J Reis (eds): Toronto Press.

164. Vaillant, G. E. (2000). Adaptive mental mechanisms: Their role in a positive psychology. *American psychologist*, 55(1), 89.
165. Valmaggia LR, Latif L, Kempton MJ et al. *Psychiatry Res* 2016;236:189-95. [PubMed]
166. Villa F.(2001) Reprimè debient le resort du rêver. *Rev Frenc Psychanal.*, vol. 1, 101-121.
167. Wang, J., Guo, W. J., Mo, L. L., Luo, S. X., Yu, J. Y., Dong, Z. Q., ... & He, N. (2017). Prevalence and strong association of high somatic symptom severity with depression and anxiety in a Chinese inpatient population. *Asia-Pacific Psychiatry*, 9(4), e12282.
168. Wang, J., Wu, X., Lai, W., Long, E., Zhang, X., Li, W., ... & Wang, D. (2017). Prevalence of depression and depressive symptoms among outpatients: a systematic review and meta-analysis. *BMJ open*, 7(8), e017173.
169. Warnes, H., & Finkelstein, A. (1971). Dreams that precede a psychosomatic illness. *Canadian Psychiatric Association Journal*, 16(4), 317-325.
170. Wikipedia, Finite-State Machine, search on Jun 1, 2019, [https://en.wikipedia.org/wiki/Finite-state\\_machine](https://en.wikipedia.org/wiki/Finite-state_machine).
171. Wolf, M., Gerlach, A., & Merkle, W. (2018). Conflict, trauma, defence mechanisms, and symptom formation. In *Psychoanalytic Psychotherapy* (pp. 61-78). Routledge.
172. Wright, R. J., Rodriguez, M., & Cohen, S. (1998). Review of psychosocial stress and asthma: an integrated biopsychosocial approach. *Thorax*, 53(12), 1066-1074.

## Annex 1. Propp's folktale morphology on Vlad scenarios mapping table.

Table 5 - Mapping of Propp's morphology on Vlad scenarios.

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
 <b>C'era una volta....</b> <i>descrivere la situazione iniziale</i>	0	i	Situazione Iniziale	Preparaz	<p>La favola di solito parte da una "situazione iniziale".</p> <p><i>Si enumerano i membri della famiglia o si introduce il futuro eroe [...] semplicemente col riportarne il nome o con l'indicarne la condizione.</i></p>	<p>Gruppo 0.1. Enumerare i membri della famiglia. // Non presente nell'interfaccia grafica</p> <p>Gruppo 0.2. Introdurre il futuro eroe (riportarne il nome e/o la condizione).</p> <p>0.2.0.a Uomo (scelta effettuata in avvio app) 0.2.0.b Donna (scelta effettuata in avvio app)</p> <p>0.2.1 Re o Regina 0.2.2 Principe o Principessa 0.2.3 Soldato o Soldatessa 0.2.4 Cavaliere o Dama 0.2.5 Contadino o Contadina 0.2.6 Impiegato o Impiegata</p>
 <b>Allontanamento</b> <i>Uno o più membri della famiglia si allontana da casa</i>	I	e	Allontanamento	Preparaz	<p>Uno dei membri della famiglia si allontana da casa.</p>	<p>Gruppo 1.1 Causa</p> <p>1.1.1 Viaggio 1.1.2 Lavoro 1.1.3 Morte o Malattia 1.1.4 Fuga o Rapimento 1.1.5 Guerra 1.1.6 Smarrimento</p> <p>Gruppo 1.2. Missione</p> <p>1.2.1 Andare o Tornare 1.2.2 Cercare o Trovare 1.2.3 Salvare o Proteggere 1.2.4 Prendere o Portare</p>

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
	II	k	Divieto	Preparaz	<p>All'eroe è imposto un divieto. In una forma inversa può essere rappresentato da un ordine o da un invito (k<sup>1</sup>).</p> <p>A volte l'ordine di non uscire è rafforzato o sostituito dall'imprigionamento (k<sup>2</sup>).</p> <p>Nella favola sono menzionati prima l'allontanamento e poi il divieto ma, la successione dei fatti è ovviamente quella contraria.</p>	<p>Gruppo 2.1 Divieto</p> <p>2.1.1 Dire o non Dire 2.1.2 Fare o non Fare 2.1.3 Andare o non Andare 2.1.4 Guardare o non Guardare 2.1.5 Toccare o non Toccare 2.1.6 Prendere o non Prendere 2.1.7 Portare o non Portare 2.1.8 Uscire o non Uscire</p> <p>Le forme di Infrazione (III) corrispondono alle forme di divieto (II). Le funzioni II e III costituiscono un elemento <i>appaiauto</i>.</p>
	III	q	Infrazione	Preparaz	<p>Il divieto è infranto.</p> <p>A volte l'infrazione può sussistere senza divieto o quest'ultimo essere implicito.</p>	<p>Gruppo 3.1 Infrazione</p> <p>- Come 2.1 -</p> <p>3.1.2 Dire o non Dire 3.1.3 Fare o non Fare 3.1.4 Andare o non Andare 3.1.5 Guardare o non Guardare 3.1.6 Toccare o non Toccare 3.1.7 Prendere o non Prendere 3.1.8 Portare o non Portare 3.1.9 Uscire o non Uscire</p> <p>Le forme di Infrazione (III) corrispondono alle forme di divieto (II). Le funzioni II e III costituiscono un elemento <i>appaiauto</i>.</p>
	IV	v	Investigazione	Preparaz	<p>L'antagonista tenta una ricognizione.</p> <p>Ha lo scopo di reperire informazioni su dove si trovino le persone o gli oggetti cercati.</p>	<p>Entra in scena l'<i>Antagonista</i>.</p> <p>NON IMPLEMENTATO</p> <p>Figure da utilizzare come <b>Antagonista</b>:</p> <ul style="list-style-type: none"> <li>a. Mago e Maga</li> <li>b. Signore Oscuro e Regina Cattiva</li> </ul>

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
					E' inversa quando la vittima interroga l'antagonista. Può realizzarsi attraverso terzi.	c. Capo Terribile o Direttrice Arpia
	V	w	Delazione	Preparaz	L'antagonista riceve informazioni sulla sua vittima.	NON IMPLEMENTATO
	VI	j	Tranello	Preparaz	L'antagonista tenta di ingannare la vittima per impadronirsi di lei o dei suoi averi.	NON IMPLEMENTATO
	VII	y	Connivenza	Preparaz	La vittima cade nell'inganno e con ciò favorisce involontariamente il nemico.	NON IMPLEMENTATO
 <p><b>Danneggiamento</b> Il cattivo provoca un danno ad un membro della famiglia: rapimento</p>	VIII	X	Danneggiamento	Esordio	<p>L'antagonista arreca danno o menomazione a uno dei membri della famiglia.</p> <p>Inizia l'azione narrativa.</p>	Gruppo 8.1. Danneggiamento 8.1.2 Rapire o Scacciare 8.1.3 Rubare o Estorcere 8.1.4 Uccidere o Ordinare di Uccidere 8.1.5 Ferire o Mutilare 8.1.6 Scaccheggiare o Devastare 8.1.7 Sposare o Affattuare 8.1.8 Nascondere o Imprigionare 8.1.9 Torturare o Dichiarare Guerra
	VIIIa	x	Mancanza	Esordio	<p>A uno dei membri della famiglia manca qualcosa o viene desiderio di qualcosa.</p> <p>La mancanza può essere causata o avvertita, essere quindi esterna o interna.</p>	Gruppo 8.2. Mancanza. 8.2.1 Una Persona 8.2.2 Un Oggetto o Animale Raro o Prezioso 8.2.3 Un Mezzo Magico 8.2.4 Il Denaro o il Cibo  Entra in scena il <b>Mandante</b> a. Uomo o Donna (generici)  Varianti della <b>Persona Ricercata</b> : a. Uomo o Donna (generici)
	IX	Y	Mediazione o momento di connessione	Esordio	La sciagura o mancanza è resa nota; ci si rivolge all'eroe con una preghiera o	NON IMPLEMENTATO

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
					un ordine e lo si manda o lo si lascia andare.	
	X	W	Inizio della reazione	Esordio	Il cercatore acconsente o si decide a reagire.	NON IMPLEMENTATO
	XI	↑	Partenza	Esordio	<p>L'eroe abbandona la casa.</p> <p>Si tratta di una peregrinazione senza scopo di ricerca, diversa dall'allontanamento. Può assumere il carattere di fuga oppure non realizzarsi affatto.</p>	<p>Gruppo 11.1. Partenza.</p> <ul style="list-style-type: none"> <li>11.1.1 Partire</li> <li>11.1.2 Perdersi</li> <li>11.1.3 Fuggire</li> <li>11.1.4 Andare in Guerra</li> <li>11.1.5 Perdere la memoria</li> <li>11.1.6 Addormentarsi</li> </ul>
	XII	D	Prima funzione del donatore Ridotto: Prove	Vicenda	<p>L'eroe è messo alla prova, interrogato, aggredito ecc., come preparazione al conseguimento di un mezzo o aiutante magico.</p>	<p>Entra in scena il <b>Donatore</b>.</p> <p>Gruppo 12.1. Prova.</p> <ul style="list-style-type: none"> <li>12.1.1 Salutare o Interrogare</li> <li>12.1.2 Lottare o Uccidere</li> <li>12.1.3 Scambiare il mezzo magico</li> <li>12.1.4 Liberare o Graziare</li> <li>12.1.5 Prestare un Servizio</li> <li>12.1.6 Altra Prova</li> </ul> <p>Tipologie di <b>Donatore</b>:</p> <ul style="list-style-type: none"> <li>a. Mago e Maga (giovani)</li> <li>b. Mago e Maga (saggi)</li> </ul>
	XIII	E	Reazione dell'eroe	Vicenda	L'eroe reagisce all'operato del futuro donatore.	<p>Gruppo 13.1. Reazione.</p> <ul style="list-style-type: none"> <li>13.1.1 Salutare o Non Salutare</li> <li>13.1.2 Rispondere o Non Rispondere</li> <li>13.1.3 Reggere o Non Reggere alla lotta</li> <li>13.1.4 Vincere o Salvanssi</li> </ul>

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
						13.1.5 Accettare uno scambio 13.1.6 Liberare o Graziare 13.1.7 Prestare o Non Prestare un Servizio 13.1.8 Altra Prova
 8	XIV	Z	Fornitura, conseguimento del mezzo magico.	Vicenda	Il mezzo magico perviene in possesso dell'eroe.	Gruppo 14.1. Mezzo Magico. 14.1.1 Animale Magico 14.1.2 Oggetto Magico 14.1.3 Oggetto che libera un Aiutante Magico 14.1.4 Poteri Magici  Gruppo 14.2 Modalità di Trasmissione. 14.2.1 Donato o Ricevuto direttamente 14.2.2 Guidato al conseguimento o Rubato 14.2.3 Costruito o Creato 14.2.4 Acquistato o Venduto 14.2.5 Ritrovato o Ricevuto casualmente 14.2.6 Apparso autonomamente 14.2.7 Bevuto o Mangiato 14.2.8 Personaggi offrono Aiuto  Varianti dell'Aiutante: a. Uomo o Donna (generico)

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
 <p><b>Trasferimento dell'eroe</b> L'eroe si trasferisce nel luogo dove troverà il fine delle sue ricerche</p>	XV	R	Trasferimento nello spazio tra due reami, indicazione del cammino.	Vicenda	L'eroe si trasferisce, è portato o condotto sul luogo in cui si trova l'oggetto delle sue ricerche.	Gruppo 15.1 Trasferimento. 15.1.1 Volare attraverso l'Aria 15.1.2 Viaggiare per Terra o Acqua 15.1.3 Venire Condotti 15.1.4 Seguire Tracce 15.1.5 Usare Mezzi fissi (scale, passaggi, ponti, ecc.) 21.1.1 Indicare un Cammino
 <p><b>La Lotta</b> L'eroe si scontra con l'antagonista in un duello</p>	XVI	L	Lotta	Vicenda	L'eroe è l'antagonista ingaggiano direttamente la lotta.  L'elemento non va confuso con la zuffa con un eventuale donatore ostile. In quel caso l'eroe alla fine viene in possesso del mezzo magico. Qui invece ottiene l'oggetto ricercato.	Gruppo 16.1 Lotta. 21.1.1 Combattimento a campo aperto 21.1.1 Competizione 21.1.1 Sfida a Carte 21.1.1 Altra Sfida

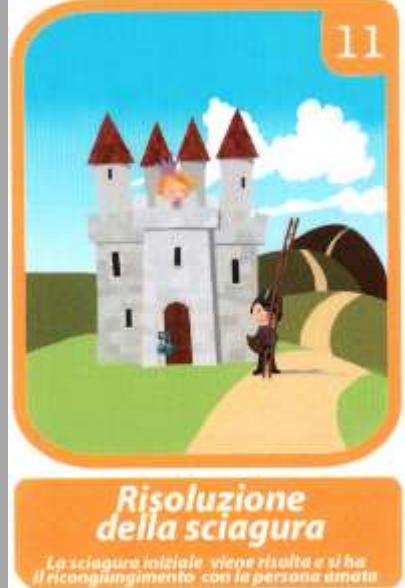
Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
	XVII	M	Marchiatura	Vicenda	All'eroe è impresso un marchio.	NON IMPLEMENTATO Gruppo 17.1 Marchio o Ferita. 21.1.1 Sul Corpo 21.1.1 Anello o Panno
	XVIII	V	Vittoria	Vicenda	L'antagonista è vinto.	NON IMPLEMENTATO Gruppo 18.1 Vittoria. 21.1.1 Vittoria in campo aperto 21.1.1 Vittoria nella Competizione 21.1.1 Vittoria alle Carte 21.1.1 Vittoria nella Altra Sfida 21.1.1 Vittoria senza Combattere 21.1.1 Scacciare l'Antagonista
	XIX	Rm	Rimozione della sciagura o della mancanza	Vicenda	E' rimossa la sciagura o la mancanza iniziale.  Questa funzione forma coppia con la funzione VIII. Qui la narrazione raggiunge l'acme.	Gruppo 19.1. Rimozione della sciagura Quale azione porta alla risoluzione della mancanza o alla conquista dell'oggetto? 19.1.2 Carpire con Forza o Astuzia 19.1.3 Conquistare o Catturare 19.1.4 Ottenere con le azioni passate 19.1.5 Impadronirsi con il Mezzo Magico 19.1.6 Eliminare la Povertà con il Mezzo Magico 19.1.7 Liberare l'Affatuato o il Prigioniero 19.1.8 Sanare le Ferite/Mutilazioni o Rianimare 19.1.9 Trovare

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
 <p><b>Il ritorno</b> <i>L'eroe intraprende la via del ritorno</i></p>	XX	↓	Ritorno	Vicenda	L'eroe ritorna.	Gruppo 20.1 Ritorno (v. 15.1 Trasferimento). 21.1.1 Volare attraverso l'Aria 21.1.1 Viaggiare per Terra o Acqua 21.1.1 Venire Condotti 21.1.1 Seguire Tracce 21.1.1 Usare Mezzi fissi (scale, passaggi, etc) 21.1.1 Indicare un Cammino
 <p><b>Persecuzione</b> <i>Si presentano nuovi nemici che bloccano il viaggio di ritorno</i></p>	XXI	P	Persecuzione, inseguimento	Vicenda	L'eroe è sottoposto a persecuzione.	Gruppo 21.1 Persecuzione. 21.1.1 Inseguire l'eroe a volo 21.1.1 Esigere il colpevole 21.1.1 Inseguire sotto forma di Animale 21.1.1 Allettare sotto forma di Oggetto sul cammino 21.1.1 Tentare di divorare o uccidere l'eroe

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
	XXII	S	Salvataggio	Vicenda	L'eroe si salva dalla persecuzione.	
 <p><b>Arrivo in incognito</b> L'eroe, travestito in modo da non essere riconosciuto, ritorna a casa</p>	XXIII	0	Arrivo in incognito		<p>L'eroe arriva in incognito a casa o in un altro paese.</p>	<p>Gruppo 23.1 Persecuzione.</p> <p>23.1.1 Arriva alla Casa di origine in incognito.      23.1.2 Arriva alla Casa e si mette a servizio.      23.1.3 Arriva presso un altro Re/Potente e si mette a servizio.</p>

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
 <p><b>L'inganno del falso eroe</b> Chi ha impedito al vero eroe di tornare a casa vittorioso cerca di accaparrarsi il merito delle imprese e chiede una ricompensa</p>	XXIV	F	Pretese infondate		Il falso eroe avanza pretese infondate.	Gruppo 24.1 Inganno del falso eroe (v.19.1). <ul style="list-style-type: none"> <li>24.1.1 Arriva alla Casa di origine in incognito.</li> <li>24.1.2 Arriva alla Casa e si mette a servizio.</li> <li>24.1.3 Carpire con Forza o Astuzia</li> <li>24.1.4 Conquistare o Catturare</li> <li>24.1.5 Ottenerе con le azioni passate</li> <li>24.1.6 Impadronirsi con il Mezzo Magico</li> <li>24.1.7 Eliminare la Povertà con il Mezzo Magico</li> <li>24.1.8 Liberare l'Affatuato o il Prigioniero</li> <li>24.1.9 Sanare le Ferite/Mutilazioni o Rianimare</li> <li>24.1.10 Trovare</li> </ul> Varianti del <b>Falso Eroe</b> : <ul style="list-style-type: none"> <li>a. Uomo o Donna</li> </ul>
 <p><b>Compito difficile</b> Per verificare l'identità del vero eroe i rivali sono sottoposti ad una prova di coraggio</p>	XXV	C	Compito difficile		All'eroe è proposto un compito difficile.	Gruppo 25.1 Compito difficile. <ul style="list-style-type: none"> <li>25.1.1 Prova del Cibo.</li> <li>25.1.2 Prova del Fuoco/Acqua bollente.</li> <li>25.1.3 Compito a Indovinelli.</li> <li>25.1.4 Compito di Scelta.</li> <li>25.1.5 Prova di Forza, Destrezza, Coraggio.</li> <li>25.1.6 Prova di Pazienza.</li> <li>25.1.7 Compito di Provvedere o Approntare. Cucire, Cucinare, Procurare, Medicare, etc</li> <li>25.1.8 Altri compiti.</li> </ul>

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
 <p><b>Superamento/ Vittoria</b> Il vero eroe superà brillantemente la prova</p>	XXVI	A	Adempimento		Il compito è eseguito.	Gruppo 26.1 Superamento/Vittoria. 26.1.1 Prova del Cibo. 26.1.2 Prova del Fuoco/Acqua bollente. 26.1.3 Compito a Indovinelli. 26.1.4 Compito di Scelta. 26.1.5 Prova di Forza, Destrezza, Coraggio. 26.1.6 Prova di Pazienza. 26.1.7 Compito di Provvedere o Approntare. Cucire, Cucinare, Procurare, Medicare, etc 26.1.8 Altri compiti.
 <p><b>Identificazione Smascheramento</b> L'antagonista è smascherato. L'eroe è riconosciuto grazie ad un oggetto che ha con sé</p>	XXVII	I	Identificazione		L'eroe è riconosciuto.	Gruppo 27.1 Identificazione/Smascheramento. 27.1.1 L'eroe è riconosciuto. 27.1.2 L'eroe è riconosciuto per un segno particolare. Ferita, stella, anello, panno, marchio. 27.1.3 L'eroe è riconosciuto per aver risolto il compito difficile.

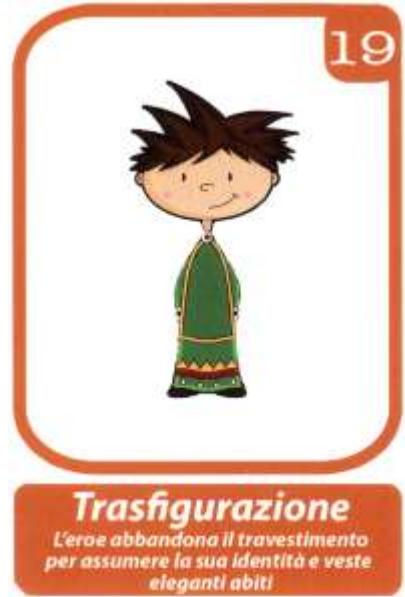
Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
	XXVIII	Sm	Smascheramento		Il falso eroe o l'antagonista è smascherato.	
	XXIX	T	Trasfigurazione		L'eroe assume nuove sembianze.	<p>Gruppo 29.1 Trasfigurazione.          29.1.1 Nuove sembianze.          Nuovo aspetto per mezzo dell'aiutante.          Intervento magico dell'aiutante          29.1.2 Palazzo Magico.          Erige o riporta all'antico splendore il palazzo.          Ferita, stella, anello, panno, marchio.          29.1.3 Nuove vesti.</p>

Image	Funct #	ID	Extended Name	Section	Propp's Description	Foreseen Actions
 <p><b>Punizione</b> Il cattivo è punito, rinchiuso nelle segrete del castello</p>	XXX	Pu	Punizione		L'antagonista è punito	Gruppo 30.1 Punizione. 30.1.1 Fucilare. 30.1.2 Scacciare. 30.1.3 Legare o Trascinare. 30.1.4 Suicidarsi. 30.1.5 Perdonare. 30.1.6 Imprigionare 30.1.7 Morire in combattimento o inseguendo l'eroe.
 <p><b>Lieto fine / Nozze</b> L'eroe si sposa .....EVISERO FELICI E CONTENTI</p>	XXXI	N	Nozze		L'eroe si sposa e sale al trono.	Gruppo 31.1 Nozze. 31.1.1 Nozze e Regno. Il Regno viene conseguito subito o in futuro. 31.1.2 Nozze. 31.1.3 Regno. 31.1.4 Fidanzamento o promessa di matrimonio. 31.1.5 Rinnovo del precedente matrimonio. 31.1.6 Ricompensa o riconoscimento.



## Annex 2. Function mapping table for Game Levels

Table 6 - Vlad functions on game levels mapping table.

Image	Function #	ID	Level 1	Level 2	Level 3	Level 4
	<b>0</b>	<b>i</b>	X	X	X	X
	<b>I</b>	<b>e</b>	X	X	X	X
	<b>II</b>	<b>k</b>	X	X	X	X
	<b>III</b>	<b>q</b>	X	X	X	X
	<b>VIII</b>	<b>X</b>	X	X	X	X
	<b>VIIIa</b>	<b>x</b>	X	X	X	X
	<b>XI</b>	<b>↑</b>	X	X	X	X
	<b>XII</b>	<b>D</b>				
	<b>XIII</b>	<b>E</b>				X
	<b>XIV</b>	<b>Z</b>			X	X
	<b>XV</b>	<b>R</b>			X	X
	<b>XVI</b>	<b>L</b>	X	X	X	X
	<b>XIX</b>	<b>Rm</b>		X		X

Image	Function #	ID	Level 1	Level 2	Level 3	Level 4
	<b>XX</b>	↓		X	X	X
    	<b>XXI</b>	<b>P</b>				X
	<b>XXII</b>	<b>S</b>				X
	<b>XXIII</b>	<b>O</b>				X
	<b>XXIV</b>	<b>F</b>		X	X	X
	<b>XXV</b>	<b>C</b>			X	X
	<b>XXVI</b>	<b>A</b>	X	X	X	X
	<b>XXVII</b>	<b>I</b>			X	X
	<b>XXVIII</b>	<b>Sm</b>			X	X
	<b>XXIX</b>	<b>T</b>				X
	<b>XXX</b>	<b>Pu</b>				X
	<b>XXXI</b>	<b>N</b>	X	X	X	X

### Annex 3. Assessment. DSQ-40.

Table 7 - DSQ-40 Questionnaire, Italian version.

#### DSQ 40

*Questo questionario consiste di 40 affermazioni ognuna delle quali è seguita da una scala di giudizio:*

Completamente in disaccordo      1 2 3 4 5 6 7 8 9      Completamente d'accordo

*Valutate quanto siete più o meno d'accordo ponendo una X da 1 a 9 per ogni affermazione*

Esempio: Milano è una città della Lombardia

1 2 3 4 5 6 7 8 9

*Scegliendo 9 indicherete che siete completamente d'accordo*

1	Sono molto contento quando ho l'occasione di aiutare qualcuno e se questa occasione viene a mancare mi sento depresso	1 2 3 4 5 6 7 8 9
3	Riesco a non pensare ad un problema fino a quando non ho tempo da dedicargli	1 2 3 4 5 6 7 8 9
5	Scarico la mia ansia facendo qualcosa di costruttivo e di creativo come dipingere o fare bricolage	1 2 3 4 5 6 7 8 9
6	Riesco a trovare buone ragioni per qualsiasi cosa io faccia	1 2 3 4 5 6 7 8 9
8	Sono capace di ridere di me stesso facilmente	1 2 3 4 5 6 7 8 9
12	Le persone tendono a maltrattarmi	1 2 3 4 5 6 7 8 9
13	Se qualcuno mi raggirasse e mi estorcesse del denaro, vorrei fosse aiutato piuttosto che punito	1 2 3 4 5 6 7 8 9
16	La gente dice che io tendo ad ignorare i fatti spiacevoli come se non esistessero	1 2 3 4 5 6 7 8 9
23	Ignoro il pericolo come se fossi Superman	1 2 3 4 5 6 7 8 9
24	Sono soddisfatto della mia abilità di ridimensionare le persone	1 2 3 4 5 6 7 8 9
27	Spesso agisco impulsivamente quando qualcosa mi infastidisce	1 2 3 4 5 6 7 8 9
28	Mi ammalio fisicamente quando le cose non mi vanno per il verso giusto	1 2 3 4 5 6 7 8 9
29	Sono una persona molto inibita	1 2 3 4 5 6 7 8 9
31	Traggo molta più soddisfazione dalle mie fantasie che dalla mia vita reale	1 2 3 4 5 6 7 8 9
37	Ho speciali qualità mi permettono di attraversare la vita senza problemi	1 2 3 4 5 6 7 8 9
38	Trovo sempre buone ragioni per giustificare quando le cose non si risolvono a mio favore	1 2 3 4 5 6 7 8 9
40	Produco molte più cose nella mia fantasia che nella vita reale	1 2 3 4 5 6 7 8 9
42	Non temo nulla	1 2 3 4 5 6 7 8 9
43	Talvolta penso di essere un "angelo", talvolta un "diavolo"	1 2 3 4 5 6 7 8 9
46	Divento apertamente aggressivo quando mi sento male	1 2 3 4 5 6 7 8 9
51	Ho sempre la sensazione che qualcuno che conosco sia come un angelo custode	1 2 3 4 5 6 7 8 9
53	Per quanto mi riguarda, le persone sono o buone o cattive	1 2 3 4 5 6 7 8 9
54	Se il mio capo mi maltrattasse, potrei, come risposta, fare degli errori nel mio lavoro o lavorare lentamente	1 2 3 4 5 6 7 8 9
58	C'è qualcuno che conosco che sa fare di tutto ed è sempre corretto e adeguato	1 2 3 4 5 6 7 8 9
59	Io riesco ad escludere i miei sentimenti quando potrebbero interferire, se li lasciassi uscire, con ciò che sto facendo	1 2 3 4 5 6 7 8 9
61	Soltanamente sono capace di vedere il lato buffo di situazioni peraltro difficili	1 2 3 4 5 6 7 8 9
62	Mi viene il mal di testa quando devo fare cose che non mi piacciono	1 2 3 4 5 6 7 8 9
63	Spesso mi ritrovo ad essere molto gentile con persone con cui avrei tutto il diritto di essere arrabbiato	1 2 3 4 5 6 7 8 9
66	Mi devo aspettare cose brutte dalla vita	1 2 3 4 5 6 7 8 9
68	Quando so di dover affrontare una situazione difficile cerco di immaginare cosa potrebbe succedere e come potrei comportarmi	1 2 3 4 5 6 7 8 9
69	I dottori non capiscono mai che cosa abbia	1 2 3 4 5 6 7 8 9
71	Dopo aver combattuto per i miei diritti tendo a chiedere scusa per la mia determinazione	1 2 3 4 5 6 7 8 9
73	Quando sono depresso o ansioso, mangiare mi fa sentire meglio	1 2 3 4 5 6 7 8 9
76	Spesso è stato detto di me che non mostro i miei sentimenti	1 2 3 4 5 6 7 8 9
81	Se io posso prevedere che mi sentirò malinconico più in là nel tempo, posso reagire meglio	1 2 3 4 5 6 7 8 9
82	Per quanto mi lamenti, non ricevo mai risposte soddisfacenti	1 2 3 4 5 6 7 8 9
83	Spesso mi ritrovo a non sentire nulla in situazioni che dovrebbero suscitare forti emozioni	1 2 3 4 5 6 7 8 9
84	Attaccarmi ad un compito a portata di mano mi tiene lontano dalla depressione e dall' ansia	1 2 3 4 5 6 7 8 9
86	Se fossi in crisi cercherei una altra persona che avesse gli stessi problemi	1 2 3 4 5 6 7 8 9
88	Se ho un pensiero cattivo sento di dover fare qualcosa per controbilanciarlo	1 2 3 4 5 6 7 8 9

## Annex 4. Assessment. Common Defense styles.

Table 8 - Common Defense Styles.

Defense styles *	Description
Denial*	Refusing to acknowledge some painful aspect of external or subjective experience.
Acting out*	Dealing with emotional conflict or external stressors by actions rather than reflections or feelings.
Altruism*	Dealing with emotional conflict or external stressors by dedication to meeting the needs of others rather than the self.
Anticipation*	Experiencing emotional reactions in advance of, or anticipating consequences of future events.
Asceticism	Eliminating the pleasurable effects of experiences.
Blocking	Temporarily or transiently inhibiting thinking.
Controlling	
Displacement*	Transferring anxiety-provoking feelings for one <i>object</i> onto another <i>object</i> .
Dissociation*	Detaching from and losing conscious contact with the environment and persons in the environment.
Distortion	Grossly reshaping external reality to suit inner needs.
Externalization	Tending to perceive in the external world and in external objects elements of one's own personality.
Humour*	Emphasizing the amusing or ironic aspects of a conflict or stressor.
Hypochondriasis	Exaggerating or overemphasising and illness for the purpose of evasion of regression.
Idealization*	Attributing exaggerated positive qualities to others.
Inhibition	Consciously limiting or renouncing ego functions.
Intellectualization	Excessive use of abstract thinking or making generalizations to control or minimize disturbing feelings.
Introjection	Internalizing the qualities of an object.
Isolation*	Separating the feelings associated with a given event or experience from the descriptive detail.
Projection*	Falsely attributing one's own distress to another <i>object</i> .
Rationalization*	Concealing true motivations with distorted elaborations and explanations, which may be exaggerated.
Reaction formation*	Substituting emotional conflict or stressors with opposite thoughts, feelings or behaviours.
Regression*	Reverting to a previously developmentally appropriate way of responding.
Repression	Expelling disturbing wishes, thoughts or experiences from conscious awareness.
Schizoid fantasy*	Fantasizing or daydreaming as a substitute for relationships with others.
Sexualization	Endowing an object or function with sexual significance that it did not previously possess, to ward off anxieties.
Somatization*	Tendency to experience and communicate psychological distress in the form of somatic symptoms and to experience medical help for them.
Splitting*	Compartmentalizing related affect states, <i>objects</i> , feelings, and thoughts, into contradictory components, and failing to integrate components into a cohesive whole.
Sublimation*	Channelling feelings or impulses into socially acceptable and productive behaviours.
Suppression*	Intentionally avoiding thinking about disturbing problems, wishes, feelings or experiences.
Passive aggression*	Indirectly or unassertively expression aggression towards others.
Undoing*	Using words or behaviours designed to negate or make amends for unacceptable thoughts, feelings or actions.

\* Included in the DSQ-40

\* Defense styles taken from: Vaillant (1994); APA (2000).

## Annex 5. Assessment. DCPR.

Table 9 - Anxiety, Nosophobia, Thanatophobia criteria in DCPR<sup>1</sup>.

### **I Diagnostic Criteria for Psychosomatic Research (DCPR)**

(Modificato da: Fava G.A., Freyberger H.J., Bech P., Christodoulou G., Sensky T., Theorell T., Wise T.N. (1995). Diagnostic criteria for use in psychosomatic research. *Psychotherapy and Psychosomatics* 63, 1-8)

#### **Ansia per la Salute** (sono richiesti entrambi i criteri A e B)

- A)** Preoccupazione generica per una malattia, per il dolore e preoccupazioni fisiche (tendenza ad amplificare le sensazioni corporee) della durata di meno di 6 mesi.
- B)** Preoccupazioni e paure rispondono prontamente a una rassicurazione medica appropriata, anche se nuove preoccupazioni possono comparire dopo un po' di tempo.

#### **Nosofobia** (sono richiesti tutti i criteri da A a C)

- A)** Paura persistente, infondata di soffrire di una specifica malattia (es. AIDS, cancro) con dubbi persistenti nonostante indagini appropriate e rassicurazioni.
- B)** Paure che tendono a manifestarsi con attacchi acuti più che con preoccupazioni costanti croniche, come nell'ipocondria; possono essere associati attacchi di panico.
- C)** L'oggetto delle paure non cambia col tempo (ossia il paziente ha paura di aver contratto sempre quella malattia, e non passa per esempio dall'AIDS al cancro) e i sintomi durano per più di 6 mesi.

#### **Tanatofobia** (sono richiesti tutti i criteri da A a C)

- A)** Attacchi con la sensazione di morte imminente e/o convinzione di morire presto, anche se non vi sono ragioni che giustifichino questa paura.
- B)** Paura marcata e persistente ed evitamento di notizie che richiamano la morte (es. funerali, necrologi); l'esposizione a questi stimoli quasi invariabilmente provoca un'immediata risposta d'ansia.
- C)** L'evitamento, l'ansia anticipatoria e l'angoscia interferiscono significativamente con il livello di adattamento della persona.

<sup>1</sup> Sources:

[http://www.grponline.org/materiali/dcpr/item/download/30\\_50c19947739ed51c860ad7cf12f3c13d](http://www.grponline.org/materiali/dcpr/item/download/30_50c19947739ed51c860ad7cf12f3c13d)  
and <http://www.fioriti.it/griglie/DCPR.pdf>

Table 10 - Disease Denial and Somatization criteria in DCPR.

**Negazione di malattia** (sono richiesti entrambi i criteri A e B)

- A)** Rifiuto persistente di avere un disturbo fisico e della necessità di trattamento medico (es. mancanza di *compliance*, ritardo nel chiedere un parere medico per sintomi fisici gravi e persistenti, comportamento controfobico) come reazione ai sintomi, segni, diagnosi o trattamento medico di una malattia fisica.
- B)** Al paziente è stata fornita una spiegazione chiara e accurata della situazione medica e il modo di gestirla.

**Sintomi Somatici Funzionali Secondari a un Disturbo Psichiatrico**  
(sono richiesti tutti i criteri da A a C)

- A)** Sintomi di attivazione autonomica (palpitazioni, sudorazione, tremore, rossore) o di un disturbo funzionale medico (es. sindrome dell'intestino irritabile, fibromialgia, astenia neurocircolatoria) che provocano sofferenza, ripetute cure mediche o peggioramento della qualità di vita.
- B)** Un'adeguata valutazione medica non rivela alcuna patologia organica che giustifichi la sofferenza fisica.
- C)** Un disturbo psichiatrico (che include nella sua manifestazione i sintomi somatici descritti) ha preceduto l'esordio dei sintomi somatici funzionali (per esempio disturbo di panico e sintomi cardiaci).

**Somatizzazione Persistente** (sono richiesti entrambi i criteri A e B)

- A)** Un disturbo funzionale medico (es. fibromialgia, stanchezza, disturbo della motilità esofagea, dispepsia, sindrome dell'intestino irritabile, astenia neurocircolatoria, sindrome uretrale), la cui durata supera 6 mesi, causa sofferenza, visite mediche ripetute o peggiora la qualità di vita.
- B)** Sono presenti sintomi aggiuntivi di attivazione autonomica che include anche altri organi (es. palpitazioni, sudorazione, tremore, rossore) ed effetti collaterali esagerati dopo terapia medica, che indicano bassa soglia di sensibilità al dolore e alta suggestibilità.

Table 11 - Conversion Symptoms and Anniversary Reactions criteria in DCPR.

**Sintomi di conversione** (sono richiesti tutti i criteri da A a C)

- A)** Uno o più sintomi o deficit che influenzano la funzione motoria o sensitiva, caratterizzati da mancanza di riscontro anatomico o fisiologico e/o assenza di segni o reperti di laboratorio e/o caratteristiche cliniche inconsistenti. Se sono presenti i sintomi di attivazione autonomica (es. palpitazioni, sudorazione, tremore, rossore) o di un disturbo funzionale medico (es. fibromialgia, sindrome da fatica cronica, disturbo da dismotilità esofagea, dispepsia funzionale, sindrome dell'intestino irritabile, astenia neurocircolatoria, sindrome uretrale), devono essere preminenti i sintomi di conversione, causare sofferenza o ripetute cure mediche, oppure peggiorare la qualità di vita.
- B)** Sono presenti almeno 2 delle seguenti caratteristiche:
- 1.** Ambivalenza in rapporto al sintomo (es. il paziente appare rilassato o indifferente quando descrive i sintomi di sofferenza).
  - 2.** Caratteristiche di una personalità istrionica (espressione, linguaggio e aspetto pittoreschi e drammatici; eccessiva dipendenza; alta suggestibilità, rapidi cambiamenti di umore).
  - 3.** Precipitazione dei sintomi conseguente a stress psicologico, associazione di cui il paziente è inconsapevole.
  - 4.** Storia di sintomi fisici simili provati dal paziente, o osservati in qualcun altro, o desiderati in qualcun altro.
- C)** Un'appropriata valutazione medica non rileva alcuna patologia organica che spieghi i disturbi fisici.

**Reazione agli Anniversari** (sono richiesti tutti i criteri da A a C)

- A)** Sintomi di attivazione autonomica (palpitazioni, sudorazione, tremore, rossore) o di un disturbo funzionale medico (es. sindrome dell'intestino irritabile, fibromialgia, astenia neurocircolatoria) o sintomi da conversione somatica che causano sofferenza o visite mediche ripetute o che peggiorano la qualità di vita.
- B)** Un'appropriata valutazione medica non rileva alcuna patologia organica che spieghi i disturbi fisici.
- C)** I sintomi sono iniziati quando il paziente ha compiuto gli anni o in occasione dell'anniversario in cui un genitore o un familiare ha contratto una malattia grave e/o è morto. Il paziente è inconsapevole di tale associazione.

Table 12 - A-type Behaviour and Irritable Mood criteria in DCPR.

**Comportamento di Tipo A** (sono richiesti entrambi i criteri A e B)

**A)** Devono essere presenti almeno 5 delle seguenti 9 caratteristiche seguenti:

1. Grado eccessivo di coinvolgimento nel lavoro o in altre attività soggette a scadenze.
2. Sensazione costante e pervasiva dell'incalzare del tempo.
3. Impiego delle modalità espressivo-motorie (parlata rapida ed esplosiva, bruschi movimenti del corpo, tensione dei muscoli facciali, gesticolazione) che indicano la sensazione di essere so-praffatti dal tempo.
4. Ostilità e cinismo.
5. Umore irritabile.
6. Tendenza ad accelerare le attività fisiche.
7. Tendenza ad accelerare le attività mentali.
8. Alto grado di ambizione di successo e riconoscimento.
9. Alta competitività.

**B)** Il comportamento provoca risposte fisiologiche connesse allo stress (palpitazioni, sudorazione, dolori muscolari, dolori epigastrici, disturbi intestinali, dispnea) che precipitano o esacerbano i sintomi di una malattia.

**Umore Irritabile** (sono richiesti tutti i criteri da A a C)

**A)** Uno stato d'animo caratterizzato da umore irritabile che viene vissuto in brevi episodi, in particolari circostanze oppure che può essere durevole e generalizzato. Richiede un aumentato auto-controllo oppure degenera in accessi verbali o comportamentali di ira.

**B)** L'esperienza dell'irritabilità è sempre spiacevole per l'individuo e le manifestazioni mancano dell'effetto catartico che hanno gli accessi giustificati di rabbia.

**C)** Lo stato d'animo provoca risposte fisiologiche legate allo stress (palpitazioni, sudorazione, dolori muscolari, dolori epigastrici, disturbi intestinali, dispnea) che precipitano o esacerbano i sintomi di un disturbo medico.

Table 13 - Demoralization and Alexithymia criteria in DCPR.

**Demoralizzazione** (sono richiesti tutti i criteri da A a C)

- A)** Uno stato d'animo caratterizzato dalla consapevolezza di aver fallito le proprie aspettative (o quelle degli altri) o di non essere capace di risolvere certi problemi urgenti. Il paziente prova sentimenti di impotenza (*helplessness*) o disperazione (*hopelessness*) o si dà per vinto (*giving up*).  
**B)** Lo stato d'animo deve essere prolungato e generalizzato (la durata deve essere almeno di un mese).  
**C)** Lo stato d'animo precede di poco il manifestarsi di un disturbo medico o esacerba i suoi sintomi.

**Alessitimia** (richiesto il criterio A)

- A)** Devono essere presenti almeno 3 delle 6 caratteristiche seguenti:
1. Incapacità a usare parole appropriate per descrivere le emozioni.
  2. Tendenza a descrivere i dettagli più che gli stati d'animo (es. le circostanze di un evento piuttosto che le sensazioni).
  3. Mancanza di un ricco mondo fantastico.
  4. Contenuti del pensiero associati più a eventi esterni che alla fantasia o alle emozioni.
  5. Inconsapevolezza delle comuni reazioni somatiche che accompagnano l'esperienza di vari stati d'animo.
  6. Scoppi occasionali ma violenti e spesso inappropriati di comportamento affettivo.

Table 14 - DCPR Interview, Italian version.

Intervista per i *Diagnostic Criteria for Psychosomatic Research* (DCPR)

Adattata da Mangelli L., Rafanelli C., Porcelli P., Fava G.A., Appendice, in Rafanelli C., Roncuzzi R., Finos L., Tossani E., Tomba E., Mangelli L., Urbinati S., Pinelli G., Fava G.A. (2003). Psychological assessment in cardiac rehabilitation. *Psychotherapy and Psychosomatics* 72, 343-349.

L'intervista è relativa agli ultimi 6 o 12 mesi. Richiede la conoscenza delle diagnosi mediche e la cronologia delle manifestazioni del disturbo nel paziente. L'intervistatore deve avere familiarità con la letteratura sui DCPR. Si raccomanda che l'intervista venga effettuata in congiunzione con la valutazione psichiatrica.

**Ansia per la salute**

**A 1.** Ha paura di avere una brutta malattia?

*SI*  *NO*

**2.** Quando avverte disturbi fisici lievi (es. sangue dal naso, raffreddore, mal di testa ecc.) si preoccupa subito (es. si allarma facilmente, consulta il suo medico di base, va al pronto soccorso, richiede gli esami medici, consulta libri o encyclopedie ecc.) di poter avere una malattia seria?

*SI*  *NO*

⇒⇒⇒(Se No, saltare a “Nosofobia”)

**B** Se il medico la rassicura riguardo la sua condizione fisica spiegandole che non ha nessuna malattia e che è in buona salute, gli crede?

*SI*  *NO*

**C** La paura di poter avere una malattia seria si è verificata negli ultimi 6 mesi?

*SI*  *NO*

*Diagnosi:* A (1 e/o 2)=si + B=si + C=si

**Nosofobia**

- A** Le è mai capitato di provare una forte ansia o di sentirsi in panico in seguito alla paura di avere contratto una specifica malattia?

*SI*  *NO*

⇒⇒⇒(Se No, saltare a “Tanatofobia”)

- B** Anche se il medico le dice che è in buona salute e gli esami di laboratorio sono normali, ha paura di avere una brutta malattia (es. cancro, AIDS)?

*SI*  *NO*

- C** La paura di avere una malattia specifica dura da più di 6 mesi?

*SI*  *NO*

*Diagnosi: A=sì + B=sì + C=sì*

**Tanatofobia**

- A** Ha mai avuto la sensazione di morte imminente o la convinzione improvvisa di stare per morire, senza trovarsi in una situazione di minaccia o di pericolo grave o reale?

*SI*  *NO*

⇒⇒⇒(Se No, saltare a “Negazione di Malattia”)

- B** Quando deve andare a un funerale, quando legge un necrologio o quando sente notizie che riguardano la morte (incidenti, disastri ecc), si allarma subito e va in ansia?

*SI*  *NO*

- C** Le capita di cambiare canale di televisione, evitare funerali o la lettura di necrologi, o di interrompere una conversazione quando si tratta di persone morte, incidenti o disastri?

*SI*  *NO*

*Diagnosi: A=sì + B=sì + C=sì*

### Negazione di Malattia

- A** 1 Le è capitato di trascurare dei disturbi fisici, di non parlarne con nessuno (neanche con un medico) e di scoprire invece di avere una malattia?

*SI*  *NO*

- 2** Se il medico le ha detto che ha una malattia e le prescrive farmaci, una dieta idonea o un'attività fisica appropriata, segue le indicazioni del medico?

*SI*  *NO*

**Se A1=no e A2=sì,**

⇒⇒⇒ saltare a “Sintomi Somatici Funzionali Secondari ad un Disturbo Psichiatrico”

- B** Il medico le ha dato spiegazioni chiare sulla sua malattia e sulla relativa terapia?

*SI*  *NO*

**Diagnosi:** A (1=sì e/o 2=No oppure 1=sì e/o 2=sì oppure 1=no e/o 2=no) + B=sì

### Sintomi Somatici Funzionali Secondari a un Disturbo Psichiatrico

- A** Ha mai sofferto di disturbi fastidiosi (es. palpitazioni, sudorazione, tremore, rossore, disturbi gastrointestinali, dolori muscolari, capogiri, stanchezza persistente) che hanno interferito con la sua vita o per i quali ha richiesto l'aiuto del medico?

*SI*  *NO*

⇒⇒⇒ (Se No, saltare a “Somatizzazione Persistente”)

- B** Il medico le ha detto che i sintomi fisici che accusa non sono dovuti a una malattia organica?

*SI*  *NO*

- C** L'intervistatore deve specificare se è presente un disturbo psichiatrico

*SI*  *NO*

- D** Se è presente un disturbo psichiatrico, l'intervistatore deve specificare se questo ha preceduto la comparsa dei sintomi somatici funzionali descritti o viceversa (es. il disturbo psichiatrico è insorto 6 mesi prima della manifestazione dei disturbi somatici funzionali oppure la manifestazione dei disturbi somatici funzionali ha preceduto di 3 mesi l'insorgenza del disturbo psichiatrico).

*SI*  *NO*

**NOTE:** SI = i sintomi funzionali somatici non precedono l'insorgenza del disturbo psichiatrico

**Diagnosi:** A=sì + B=sì + C=sì

(confrontare l'insorgenza di entrambi i disturbi)

### Somatizzazione Persistente

**A** Si è mai fatto visitare o comunque ha mai sofferto per più di 6 mesi di uno dei seguenti disturbi, per il quale ha intrapreso un trattamento medico o ha verificato un peggioramento della qualità della sua vita?

- Dolori e fastidi muscolari
- Stanchezza persistente
- Dolori di stomaco e/o addominali associati a bruciore, senso di piezzezza, digestione lenta o eruttazioni
- Stitichezza o diarrea
- Palpitazioni
- Difficoltà respiratorie
- Altri

*SI*  *NO*

⇒⇒⇒ (Se No, saltare a "Sintomi di Conversione")

**B** Le è stata specificata una causa organica per questi disturbi?

*SI*  *NO*

**C** 1 Se le sono stati prescritti farmaci per questi disturbi, ha sofferto di importanti effetti collaterali?

*SI*  *NO*

2 Si è sentito peggio?

*SI*  *NO*

3 A parte il disturbo principale, ha avuto altri problemi fisici?

*SI*  *NO*

*Diagnosi: A=si + B=no + C (1 e/o 2 e/o 3)=si*

### Sintomi di Conversione

**A** Ha mai sofferto di uno dei seguenti disturbi fisici: disturbo dell'equilibrio, paralisi o debolezza localizzate, perdita della voce, difficoltà a mangiare, perdita della sensibilità tattile, vederci doppio o perdita della vista?

*SI*  *NO*

⇒⇒⇒ (Se No, saltare a "Reazione agli Anniversari")

**B** Il medico ha riscontrato una causa organica o qualche elemento specifico che possa spiegare i sintomi?

*SI*  *NO*

**C** 1 Si è verificato qualche avvenimento particolare prima della comparsa dei suddetti sintomi?

*SI*  *NO*

Se SI, ritiene che i sintomi siano collegati a questo avvenimento?

*SI*  *NO*

**2** Ha mai avuto gli stessi sintomi in passato?

*SI*  *NO*

Oppure ha osservato gli stessi sintomi in qualcuno a Lei vicino?

*SI*  *NO*

**3** L'intervistatore deve valutare se è presente ambivalenza del paziente rispetto al sintomo

*SI*  *NO*

**4** L'intervistatore deve valutare le caratteristiche di una personalità istrionica

*SI*  *NO*

*Diagnosi: A=si + B=no + C (almeno 2 delle 4 caratteristiche)=si*

#### **Reazione agli Anniversari**

**A** Se ha sofferto di uno o più sintomi elencati in precedenza (palpitazioni, sudorazione, tremore, rossori, sintomi gastrointestinali, dolori muscolari, stanchezza persistente, disturbo dell'equilibrio, paralisi o debolezza localizzate, perdita della voce, difficoltà a mangiare, perdita della sensibilità tattile o dolorifica, vederci doppio o perdita della vista) e il medico non ha riscontrato nessuna malattia, si ricorda un avvenimento particolare che ha preceduto la comparsa dei sintomi?

*SI*  *NO*

⇒⇒⇒ (Se No, saltare a “Comportamento di Tipo A”)

**B** **1** Si ricorda se sono comparsi in coincidenza di una data per Lei importante o alla stessa età in cui un suo familiare ha avuto qualcosa di grave?

*SI*  *NO*

Se SI, crede che i sintomi siano legati a questo evento?

*SI*  *NO*

**2** Qualche persona della sua famiglia ha avuto seri problemi di salute o è deceduto quando aveva l'età che Lei ha adesso?

*SI*  *NO*

*Diagnosi: A=sì + B (1 e/o 2)=sì*

### **Comportamento di Tipo A**

**A** **1** Rimane spesso più del dovuto sul posto di lavoro per finire alcuni compiti o attività di cui si sente particolarmente responsabile o che deve portare a termine entro un certo periodo di tempo?

*SI*  *NO*

**2** Ha spesso la sensazione di non aver tempo a sufficienza per ultimare le attività (lavorative e non) che ha iniziato?

*SI*  *NO*

**3** *Il paziente parla in maniera molto rapida e concitata, si muove in maniera brusca, gesticola in maniera evidente, si nota tensione ai muscoli del viso?*

*SI*  *NO*

**4** Quando avverte la sensazione di non avere tempo a sufficienza, si rivolge alle persone attorno a Lei in modo aggressivo?

*SI*  *NO*

**5** Le capita di sentirsi spesso irritato?

*SI*  *NO*

**6** Tende a camminare, muoversi, agire, gesticolare velocemente?

*SI*  *NO*

**7** Sente di avere molte idee o di pensare a più cose contemporaneamente?

*SI*  *NO*

**8** Ritiene di essere molto ambizioso nel lavoro, è sempre alla ricerca di qualche riconoscimento in più rispetto ad altre persone?

*SI*  *NO*

**9** Si sente molto in competizione con i suoi colleghi di lavoro?

**(Se meno di 5 = SI,      =>=> saltare a “Umore Irritabile”)**

**B** Ha sintomi fisici come sudorazione, palpitazioni, tensione muscolare, disturbi intestinali, dolori allo stomaco, respiro veloce?

*SI*  *NO*

*Diagnosi: A (almeno 5 caratteristiche)=si + B=si*

### **Umore Irritabile**

**A** 1 Quando a volte si sente irritabile (episodi brevi o prolungati, occasionali o costanti), deve esercitare un forte controllo su di sé per non "scoppiare"?

*SI*  *NO*

**2** Oppure ha scippi verbali o comportamentali incontrollabili, come alzare la voce, sbattere la porta, battere i pugni sul tavolo?

*SI*  *NO*

⇒⇒⇒ (Se No, saltare a "Demoralizzazione")

**B** Dopo che è "esploso", continua a star male?

*SI*  *NO*

**C** Quando è irritato, sente che il cuore le batte forte oppure compaiono altri sintomi?

*SI*  *NO*

*Diagnosi: A (1 e/o 2)=si + B=si + C=si*

### **Demoralizzazione**

**A** 1 Pensa di non aver raggiunto gli obiettivi che si era prefissato o che gli altri si aspettano da Lei (es. lavorativi, economici, familiari o sociali)?

*SI*  *NO*

**2** C'è qualche problema urgente che sente di non essere in grado di risolvere?

*SI*  *NO*

**3** Ha sensazioni di impotenza, disperazione o di non farcela?

*SI*  *NO*

⇒⇒⇒ (Se No, saltare a "Alessitimia")

**B** Questa sensazione di impotenza e disperazione dura da almeno un mese? *SI*  *NO*

**C** Questo stato d'animo ha preceduto la comparsa di disturbi fisici o li ha peggiorati?

*SI*  *NO*

*Diagnosi: A (1 e/o 2 e/o 3)=si + B=si + C=si*

### Alessitimia

L'intervistatore deve valutare il contenuto globale dell'intervista e il comportamento non verbale del paziente, in aggiunta alle seguenti domande:

- A** 1 Quando le capita qualcosa di bello o brutto, riesce a descrivere le proprie emozioni (es. gioia, piacere, preoccupazione, tristezza, rabbia)?

*SI*  *NO*

- 2 Quando le capita di affrontare qualche evento bello o brutto, racconta agli altri che cosa è accaduto e quello che ha provato dentro di sé?

*SI*  *NO*

- 3 Le capita spesso di sognare a occhi aperti e fantasticare?

*SI*  *NO*

- 4 I suoi pensieri coinvolgono anche il mondo interno delle emozioni e dei sentimenti?

*SI*  *NO*

- 5 Quando vive una forte emozione, avverte anche delle reazioni fisiche (es. mal di stomaco, ecc.)?

*SI*  *NO*

- 6 Le è mai capitato di avere sfoghi momentanei di rabbia, pianto, o gioia, eccessivi sia rispetto a ciò che stava accadendo, sia rispetto al suo comportamento abituale?

*SI*  *NO*

*Diagnosi: A1=no; A2=no; A3=no; A4=no; A5=no; A6=sì  
(almeno 3 caratteristiche)*

## Annex 6. Assessment. TAS-20.

Table 15 - TAS-20 Interview, Italian version<sup>2</sup>.

### **TAS – 20**

**Toronto Alexithymia Scale**  
G.J. TAYLOR, R.M. BAGBY, J.D.A. PARKER, 1992

Seguendo le istruzioni sotto elencate indichi quanto è d'accordo o no con ciascuna delle seguenti affermazioni segnando una x sopra il numero corrispondente.

Segnare una sola risposta per ciascuna frase.

- 1 = NON SONO PER NIENTE D'ACCORDO**  
**2 = NON SONO MOLTO D'ACCORDO**  
**3 = NON SONO NÉ D'ACCORDO NÉ IN DISACCORDO**  
**4 = SONO D'ACCORDO IN PARTE**  
**5 = SONO COMPLETAMENTE D'ACCORDO**

1.	Sono spesso confuso/a circa le emozioni che provo	1	2	3	4	5
2.	Mi è difficile trovare le parole giuste per esprimere i miei sentimenti	1	2	3	4	5
3.	Provo delle sensazioni fisiche che neanche i medici capiscono	1	2	3	4	5
4.	Riesco facilmente a descrivere i miei sentimenti	1	2	3	4	5
5.	Preferisco approfondire i miei problemi piuttosto che descriverli semplicemente	1	2	3	4	5
6.	Quando sono sconvolto/a non so se sono triste, spaventato/a o arrabbiato/a	1	2	3	4	5
7.	Sono spesso disorientato dalle sensazioni che provo nel mio corpo	1	2	3	4	5
8.	Preferisco lasciare che le cose seguano il loro corso piuttosto che capire perché sono andate in quel modo	1	2	3	4	5
9.	Provo sentimenti che non riesco proprio ad identificare	1	2	3	4	5
10.	È essenziale conoscere le proprie emozioni	1	2	3	4	5
11.	Mi è difficile descrivere ciò che provo per gli altri	1	2	3	4	5
12.	Gli altri mi chiedono di parlare di più dei miei sentimenti	1	2	3	4	5
13.	Non capisco cosa stia accadendo dentro di me	1	2	3	4	5
14.	Spesso non so perché mi arrabbio	1	2	3	4	5
15.	Con le persone preferisco parlare di cose di tutti i giorni piuttosto che delle loro emozioni	1	2	3	4	5
16.	Preferisco vedere spettacoli leggeri, piuttosto che spettacoli a sfondo psicologico	1	2	3	4	5
17.	Mi è difficile rivelare i sentimenti più profondi anche ad amici più intimi	1	2	3	4	5
18.	Riesco a sentirmi vicino ad una persona, anche se ci capita di stare in silenzio	1	2	3	4	5
19.	Trovo che l'esame dei miei sentimenti mi serve a risolvere i miei problemi personali	1	2	3	4	5
20.	Cercare significati nascosti in films o commedie distoglie dal piacere dello spettacolo	1	2	3	4	5

<sup>2</sup> Source: <https://www.lumsa.it/sites/default/files/UTENTI/u432/TAS-20.pdf>

## Annex 7. Assessment. SMQ.

Table 16 - Suppression Mental Questionnaire, Italian version<sup>3</sup>.

### Suppression mental questionnaire

(di S. Settineri et al)

	Vero		Falso		
	1	2	3	4	5
<b>1. Riesco facilmente a controllare le mie emozioni</b>					
<b>2. Quando provo gioia riesco a nasconderla</b>	1	2	3	4	5
<b>3. Quando ho un brutto pensiero riesco a toglierlo dalla mente</b>	1	2	3	4	5
<b>4. Ho la tendenza a rimuginare</b>	1	2	3	4	5
<b>5. Sono portato a fantasticare</b>	1	2	3	4	5
<b>6. Mi piacciono i sogni ad occhi aperti</b>	1	2	3	4	5
<b>7. Sono una persona controllata</b>	1	2	3	4	5
<b>8. Quando sono irritato/a riesco facilmente a calmarmi</b>	1	2	3	4	5
<b>9. Ho molta immaginazione</b>	1	2	3	4	5
<b>10. Quando sono ansioso/a riesco facilmente a liberarmene e dedicarmi ad un'altra attività</b>	1	2	3	4	5
<b>11. Di tanto in tanto ho un'idea di cui non riesco a liberarmi</b>	1	2	3	4	5
<b>12. Di tanto in tanto mi viene in mente un motivo musicale che non riesco a togliermi</b>	1	2	3	4	5
<b>13. Mi ritengo molto razionale</b>	1	2	3	4	5
<b>14. Non credo di arrabbiarmi più delle altre persone</b>	1	2	3	4	5
<b>15. Credo di controllarmi più delle altre persone</b>	1	2	3	4	5
<b>16. Riesco a togliermi facilmente dalla mente immagini che non sono secondo me accettabili</b>	1	2	3	4	5
<b>17. Il mio pensiero è facilmente libero da emozioni</b>	1	2	3	4	5
<b>18. Riesco a togliermi dalla mente desideri che non ritengo accettabili</b>	1	2	3	4	5

<sup>3</sup> Source: <http://cab.unime.it/journals/index.php/MJCP/article/view/1282>

## Annex 8. Assessment. ER89-Revisited Italian/English.

Table 17 - ER89-Revisited, Italian and English items<sup>4</sup>.

English Item	Italian Item
1. I am generous with my friends	1. Sono generoso con i miei amici
2. I quickly get over and recover from being startled	2. Rapidamente supero l'imbarazzo e mi riprendo dagli stati che generano agitazione e tensione
3. I enjoy dealing with new and unusual situations	3. Mi piace affrontare situazioni nuove ed insolite
4. I usually succeed in making a favorable impression on people	4. In genere riesco a suscitare negli altri una buona impressione
5. I enjoy trying new foods I have never tasted before	5. Mi piace provare cibi che non ho mai assaggiato prima
6. I am regarded as a very energetic person	6. Mi si considera una persona piena di energia
7. I like to take different paths to familiar places	7. Mi piace prendere strade diverse per raggiungere gli stessi luoghi
8. I am more curious than most people	8. Sono più curioso della maggior parte delle persone
9. Most of the people I meet are likeable	9. La maggior parte delle persone che incontro sono gradevoli
10. I usually think carefully about something before acting	10. In genere rifletto accuratamente prima di agire
11. I like to do new and different things	11. Amo fare cose nuove e diverse
12. My daily life is full of things that keep me interested	12. La mia vita di ogni giorno è piena di cose che mi interessano
13. I would be willing to describe myself as a pretty "strong" personality	13. Mi piacerebbe potermi descrivere come una "forte personalità"
14. I get over my anger at someone reasonably quickly	14. Supero la mia irritazione nei confronti di un'altra persona abbastanza rapidamente

<sup>4</sup> Source: <https://www.tpm.org/wp-content/uploads/2014/11/14.3.4.pdf>

## Annex 9. Computer Literacy Questionnaire (Italian)

### Questionario di alfabetizzazione informatica

Adesso ti rivolgerò alcune domande che riguardano l'uso del computer, del telefono cellulare e di altre tecnologie della comunicazione. Ti chiedo, gentilmente, di rispondere alle domande con sincerità. Chiedimi tutte le spiegazioni che ti servono per capire bene le mie domande.

1) A casa o dove vivi ti capita o ti capitava di usare un computer?

sì       no

Se sì, quante volte alla settimana (tutti i giorni, etc.)?

---

Per quanti minuti al giorno circa (nei giorni in cui lo usi)?

---

Che cosa fai (facevi) quando usi (usavi) il computer? (Videogame, navigazione su Internet, Skype, Facebook o altri Social Network, Posta Elettronica, chat, Youtube, Radio, etc.)

---

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2) A casa o dove vivi ti capita o ti capitava di usare un Tablet?

sì       no

Se sì, quante volte alla settimana (tutti i giorni, etc.)?

---

Per quanti minuti al giorno circa (nei giorni in cui lo usi)?

---

Che cosa fai (facevi) quando usi (usavi) il tablet? (Videogame, navigazione su Internet, Facebook, Skype, posta elettronica, chat, Youtube, radio, etc.)

---

---

---

---

3) Ti capita o ti capitava di usare un telefono cellulare?

sì       no

Se sì, era il tuo telefono cellulare personale?

sì       no

Quante volte alla settimana usi o usavi il telefono cellulare (tutti i giorni, etc.)?

---

---

Circa per quanti minuti al giorno (nei giorni in cui lo usi o lo usavi)?

---

---

Che cosa fai quando usi il telefono cellulare? (Messaggi, Chiamate Telefoniche, Videogame, Skype, navigazione su Internet, Facebook, Posta Elettronica, Chat, Youtube, radio, etc.)

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---

Sei a tuo agio nell'utilizzo della modalità touchscreen, se ti è capitato di provarla? (Toccare lo schermo con le dita per selezionare opzioni, navigare in Internet, etc.)?

sì       no

4) Partecipi o hai partecipato a corsi di informatica?

sì       no

5) Sai usare o sapevi usare il telecomando per programmare i canali dell'antenna sul televisore dopo averlo acquistato o quando se ne manifestava il bisogno (RAI1, RAI2, RAI3 etc.)?

si       no

Sul televisore usi o usavi televideo per acquisire informazioni utili sul tempo, sui programmi televisivi della settimana, etc.?

sì       no

## Annex 10. Computer Literacy Questionnaire (English)

### Computer Literacy Questionnaire

Now I will ask you some questions regarding the use of the computer, mobile phone and other communication technologies. I kindly ask you to answer to the questions honestly. Ask me for all the explanations you need to understand my questions well.

1) Do you happen, or did you happen, to use a computer at home or where you live?

yes       no

If yes, how many times per week (every day, etc.)?

---

For how many minutes approximately a day (on the days you use it)?

---

What do you do (did) when you use (used) the computer? (Video games, Internet browsing, Skype, Facebook or other Social Networks, Skype, email, chat, Youtube, Radio, etc.)

---

---

---

---

2) Do you happen, or did you happen, to use a tablet at home or where do you live?

yes       no

If yes, how many times a week (every day, etc.)?

---

For how many minutes approximately a day (on the days you use it)?

---

What do you do (did) when you use (used) the tablet? (Video games, Internet browsing, Facebook, Skype, email, chat, Youtube, radio, etc.)

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---

---

3) Do you happen, or did you happen to you, to use a mobile phone?

yes       no

If so, was it your personal cell phone?

yes       no

How many times a week do you use or use the mobile phone (every day, etc.)?

---

---

About how many minutes a day (on the days you use or use it)?

---

---

What do you do when you use your mobile phone? (Messages, Phone calls, Video Games, Skype, Internet browsing, Facebook, e-mail, Chat, Youtube, Radio, etc.)

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Are you comfortable in using the touchscreen mode, if it happened to you to try it? (Touch the screen with your fingers to select options, surf the internet etc.)?

yes       no

4) Do you participate or have you participated in computer courses?

yes       no

5) Can you use, or did you know how to use, the remote control to program the antenna channels on the TV after purchasing it or when the need arose (RAI1, RAI2, RAI3 etc.)?

yes       no

Do you use or used teletext on the TV to acquire useful information about the weather, the TV programs of the week, etc.?

yes       no

## Annex 11. Patient's requirements questionnaire (Italian)

### Questionario sui *requirement* dei pazienti sul servizio di training della Creatività

Stiamo conducendo uno studio su come misurare e migliorare la creatività dei nostri pazienti. Ti chiedo, gentilmente, di aiutarci a svolgerci il nostro studio rispondendo alle domande che ti farò con sincerità. Chiedimi tutte le spiegazioni che ti servono per capire bene le mie domande.

- 1) Hai mai svolto, in uno studio medico, test per valutare o migliorare l'attenzione, la memoria, la creatività?

sì       no

Se sì, ti ricordi cosa ti veniva chiesto di fare? Puoi dare una o più delle seguenti risposte:

- dovevo rispondere a voce ad alcune domande
- dovevo scrivere su un foglio la risposta ad alcune domande
- dovevo rispondere ad alcune domande usando alcuni oggetti
- dovevo ascoltare un audio e/o osservare un video e dopo dare una risposta
- dovevo dare la risposta ad alcune domande usando un tablet o un computer
- dovevo giocare con una specie di videogame

- 2) e dovessi svolgere un test per valutare o migliorare attenzione, memoria o creatività, come lo preferiresti? Dai un voto da 1 a 10 ai seguenti tipi di test (10 indica che ti piacerebbe molto, 1 che non ti piacerebbe per niente);

- devi rispondere a voce ad alcune domande \_\_\_\_\_
- devi scrivere su un foglio la risposta ad alcune domande \_\_\_\_\_
- devi rispondere ad alcune domande usando alcuni oggetti \_\_\_\_\_
- devi ascoltare un audio e/o osservare un video e dopo dare una risposta \_\_\_\_\_
- devi dare la risposta ad alcune domande usando un tablet o un computer \_\_\_\_\_
- devi giocare con una specie di videogame al computer \_\_\_\_\_

3) Ti piacerebbe svolgere alcuni test per valutare o migliorare attenzione, memoria o creatività che siano simili ad un gioco al computer con uno schermo in cui le immagini tridimensionali degli oggetti li facciano sembrare quasi reali?

sì       no

Se sì, saresti disposto a venire da noi per svolgere questi test?

sì       no

Se sì, quante volte alla settimana saresti disposto a venire da noi? Per quanti mesi?

---

## Annex 12. Patient's requirements questionnaire (English)

### **Survey on patient *requirements* on the Creativity training service**

We are conducting a study on how to measure and improve the creativity of our patients. I kindly ask you to help us carry out our study by answering the questions that I will ask you sincerely. Ask me for all the explanations you need to understand my questions well.

- 1) Have you ever carried out tests in a physician's office to evaluate or improve attention, memory, or creativity?

yes     no

If yes, do you remember what you were asked to do? You can give one or more of the following answers:

- I had to answer some questions verbally
- I had to write the answer of some questions on a piece of paper
- I had to answer some questions using some objects
- I had to listen to an audio and/or watch a video and then give an answer
- I had to answer some questions using a tablet or computer
- I had to play with a kind of video game

- 2) If you had to take a test to evaluate or improve attention, memory or creativity, how would you prefer it? Rate from 1 to 10 to the following types of tests (10 indicates that you would like very much, 0 that you would not like at all);

- you have to answer some questions verbally \_\_\_\_\_
- you have to write the answer to some questions on sheet \_\_\_\_\_
- you have to answer some questions using some objects \_\_\_\_\_
- you have to listen to an audio and/or watch a video and then give an answer \_\_\_\_\_
- you need to answer some questions using a tablet or computer \_\_\_\_\_
- you have to play some kind of computer game \_\_\_\_\_

- 3) Would you like to carry out some tests to evaluate or improve attention, memory or creativity that are similar to a computer game with a screen in which the three-dimensional images of the objects make them seem almost real?

yes     no

If yes, would you be willing to come to us for these tests?

yes     no

If yes, how many times a week would you be willing to come to us? For how many months?

---

## Annex 13. Likeability Questionnaire (Italian)

### **Questionario di gradimento sull'App Vlad (versione per adulti)**

Adesso ti rivolgerò alcune domande sulla esperienza d'uso della App di Realtà Virtuale Vlad per lo Storytelling e il miglioramento della Creatività. Ti chiedo, gentilmente, di rispondere alle domande con sincerità. Chiedimi tutte le spiegazioni che ti servono per capire bene le mie domande.

Dovrai barrare con una “X” soltanto una tra le tre risposte possibili (per dire “poco” metti la “X” sullo smile rosso 😞; per dire “abbastanza” mettila sullo smile giallo 😎; per dire “molto” mettila sullo smile verde 😊).

		POCO	ABBASTANZA	MOLTO
1	Ti è piaciuto usare l'App Vlad?			
2	Ti sei sentita/o a tuo agio nell'usare Vlad?			
3	Le istruzioni d'uso di Vlad erano facili da capire?			
4	Senti di aver imparato cose nuove e interessanti?			
5	C'è qualche aspetto di Vlad che ti ha dato fastidio nella procedura o nei dispositivi da utilizzare? (Trascrivere la risposta verbale)	 _____ _____		
6	Qualche volta ti sei stancato/a? Se sì, quante volte? (Trascrivere risposta verbale)	 _____		
7	Qualche volta ti sei annoiato/a? Se sì, quante volte? (Trascrivere risposta verbale)	 _____		

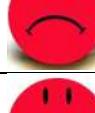
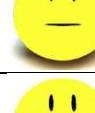
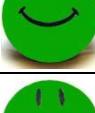
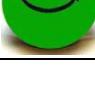
8	<p>Qualche volta Vlad ti è sembrato funzionare male? Se sì, in cosa e quante volte? (Trascrivere risposta verbale)</p> <hr/> <hr/>			
9	<p>Qualche volta ti sei arrabbiato/a o rattristato/a? Se sì, per cosa e quante volte? (Trascrivere anche risposta verbale)</p> <hr/> <hr/>			
10	<p>C'è qualcosa in particolare che non ti piaciuto di Vlad? Cosa? (Trascrivere la risposta verbale)</p> <hr/> <hr/> <hr/>			
11	<p>Alla fine della sessione d'uso hai avuto mal di testa o qualche malessere fisico? Se sì, cosa e quante volte? (Trascrivere anche risposta verbale)</p> <hr/> <hr/>			
12	<p>Preferisci l'uso di Vlad ai test fatti dando le risposte su fogli di carta o parlando ad una dottoressa o un dottore in persona?</p>			
13	<p>Ritorneresti per continuare questa esperienza in futuro?</p>			
14	<p>Consiglieresti ad altre persone l'uso di Vlad per il miglioramento della Creatività?</p>			

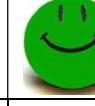
## Annex 14. Likeability Questionnaire (English)

### Likeability Questionnaire for Vlad App (adults)

Now I will ask you some questions about the experience of using the Vlad Virtual Reality App for Storytelling and the improvement of Creativity. I kindly ask you to answer sincerely to some questions. Ask me for all the explanations you need to understand my questions well.

You will have to cross with an "X" only one of the three possible answers (to say "little" put the "X" on the red smile ; to say "enough" put it on the yellow smile ; to say "much" put it on the green  smile)

		A LITTLE	ENOUGH	MUCH
1	Did you like using the App Vlad?			
2	Did you feel comfortable using the App Vlad?			
3	Were Vlad's instructions for use easy to understand?			
4	Do you feel you have learnt new and interesting things?			
5	Is there any aspect of Vlad that bothered you in the procedure or in the devices to be used? (Write down the verbal answer)  _____ _____			
6	Did you get tired sometimes? If yes, how many times? (Write down verbal answers)  _____ _____			
7	Did you get bored sometimes? If yes, how many times? (Write down verbal answers)  _____ _____			

<b>8</b>	<p>Did Vlad seem to malfunction sometimes?          If yes, in what and how many times?          (Write down verbal answer)</p> <hr/> <hr/>			
<b>9</b>	<p>Do you sometimes get angry or sad?          If yes, for what and how many times?          (Write down also verbal answers)</p> <hr/> <hr/>			
<b>10</b>	<p>Is there anything in particular that you didn't like about Vlad? What? (Write down the verbal answer)</p> <hr/> <hr/>			
<b>11</b>	<p>Did you have a headache or some physical discomfort at the end of the session?          If yes, what and how many times?          (Write down also verbal answer)</p> <hr/> <hr/>			
<b>12</b>	<p>Do you prefer Vlad's use to the tests done by giving answers on sheets of paper or by speaking to a doctor in person?</p>			
<b>13</b>	<p>Would you come back to continue this experience in the future?</p>			
<b>14</b>	<p>Would you propose to other people the use of Vlad for the improvement of creativeness?</p>			

## Annex 15. Validation Instruments

User#1

### QSkill - Questionario di alfabetizzazione informatica - Adulto

Adesso ti rivolgerò alcune domande che riguardano l'uso del computer, del telefono cellulare e di altre tecnologie della comunicazione. Ti chiedo di rispondere alle domande con sincerità. Chiedi tutte le spiegazioni che servono per comprendere bene le domande.

1) A casa o dove vivi ti capita o ti capitava di usare un computer? Sì  No

Se sì, quante volte alla settimana (tutti i giorni, etc.)? TUTTI I GIORNI

Per quanti minuti al giorno circa (nei giorni in cui lo usi)? 2 ORE

Che cosa fai (facevi) quando usi (usavi) il computer? (Videogame, navigazione su Internet, Skype, Facebook o altri Social Network, Skype, posta elettronica, chat, Youtube, Radio, etc.)

NAVIGAZIONE, SKYPE, POSTA ELETTRONICA, CHAT, OPEN SOURCE SYSTEM, YOUTUBE, PIATTAFORME ACCADEMICHE, OFFICE

2) A casa o dove vivi ti capita o ti capitava di usare un Tablet? Sì  No

Se sì, quante volte alla settimana (tutti i giorni, etc.)?

Per quanti minuti al giorno circa (nei giorni in cui lo usi)?

Che cosa fai (facevi) quando usi (usavi) il tablet? (Videogame, navigazione su Internet, Facebook, Skype, posta elettronica, chat, Youtube, radio, etc.).

3) Ti capita o ti capitava di usare un telefono cellulare? Sì  No

Se sì, era il tuo telefono cellulare personale? Sì  No

Quante volte alla settimana usi o usavi il telefono cellulare (tutti i giorni, etc.)? TUTTI I GIORNI

Circa per quanti minuti al giorno (nei giorni in cui lo usi o lo usavi)? 2 ORE

Che cosa fai quando usi il telefono cellulare? (Messaggi, Chiamate Telefoniche, Videogame, Skype, navigazione su Internet, Facebook, Posta Elettronica, Chat, Youtube, radio, etc.)

MESSAGGI, CHIAMATE, POSTA ELETTRONICA, CHAT

Sei a tuo agio nell'utilizzo della modalità touchscreen, se ti è capitato di provarla? (Toccare lo schermo con le dita per selezionare opzioni, navigare in Internet, etc.)? Sì  No

4) Partecipi o hai partecipato a corsi di informatica? Sì  No

5) Sai usare o sapevi usare il telecomando per programmare i canali dell'antenna dopo averlo acquistato o quando se ne manifestava il bisogno (RAI1, RAI2, RAI3 etc.)? Sì  No

Sul televisore usi o usavi televideo per acquisire informazioni utili sul tempo, sui programmi televisivi della settimana, etc.? Sì  No

Data di compilazione 19/5/2020

Periodo: Iniziale  Intermedio  Finale

Vlad - QSkill questionnaire, versione per adulti. Rel.1.0.0 – Pag. 1

## QReq - Requirement sul servizio di training della Creatività - Adulto

Stiamo conducendo uno studio su come misurare e migliorare la creatività dei nostri pazienti. Ti chiedo, gentilmente, di aiutarci a svolgerci il nostro studio rispondendo alle domande che ti farò con sincerità. Chiedi tutti i chiarimenti che servono per comprendere bene le domande.

- 1) Hai mai svolto, in uno studio medico, test per valutare o migliorare l'attenzione, la memoria, la creatività?       Sì       No

Se sì, ti ricordi cosa ti veniva chiesto di fare? Puoi dare una o più delle seguenti risposte:

- dovevo rispondere a voce ad alcune domande
- dovevo scrivere su un foglio la risposta ad alcune domande
- dovevo rispondere ad alcune domande usando alcuni oggetti
- dovevo ascoltare un audio e/o osservare un video e dopo dare una risposta
- dovevo dare la risposta ad alcune domande usando un tablet o un computer
- dovevo giocare con una specie di videogame

- 2) Se dovessi svolgere un test per valutare o migliorare attenzione, memoria o creatività, come lo preferiresti? Dai un voto da 1 a 10 ai seguenti tipi di test (10 indica che ti piacerebbe molto, 1 che non ti piacerebbe per niente);

- devi rispondere a voce ad alcune domande 4
- devi scrivere su un foglio la risposta ad alcune domande 2
- devi rispondere ad alcune domande usando alcuni oggetti 3
- devi ascoltare un audio e/o osservare un video e dopo dare una risposta 6
- devi dare la risposta ad alcune domande usando un tablet o un computer 5
- devi giocare con una specie di videogame al computer 7

- 3) Ti piacerebbe svolgere alcuni test per valutare o migliorare attenzione, memoria o creatività che siano simili ad un gioco al computer con uno schermo in cui le immagini tridimensionali degli oggetti li facciano sembrare quasi reali?       sì       no

Se sì, saresti disposto a venire da noi per svolgere questi test?  sì       no

Se sì, quante volte alla settimana saresti disposto a venire da noi? Per quanti mesi?

1 VOLTA A SETTIMANA PER UN MESE

Data di compilazione 19/5/2020

Periodo:      Iniziale       Intermedio       Finale

## QLike - Questionario di gradimento sull'App Vlad - Adulto

Adesso ti rivolgerò alcune domande sulla esperienza d'uso della App di Realtà Virtuale Vlad per lo Storytelling e il miglioramento della Creatività. Ti chiedo, gentilmente, di rispondere alle domande con sincerità. Chiedi tutte le spiegazioni che servono per comprendere le domande.

Barrare con una "X" solo una tra le tre risposte possibili (per dire "poco" metti una "X" sullo smile rosso ; per "abbastanza", sullo smile giallo ; per "molto" usa lo smile verde ).

		POCO	ABBASTANZA	MOLTO
1	Ti è piaciuto usare l'App Vlad?			
2	Ti sei sentita/o a tuo agio nell'usare Vlad?			
3	Le istruzioni d'uso di Vlad erano facili da capire?			
4	Senti di aver imparato cose nuove e interessanti?			
5	C'è qualche aspetto di Vlad che ti ha dato fastidio nella procedura o nei dispositivi da utilizzare? (Trascrivere la risposta verbale)	 <u>IL VISIONE NON È MOLTO COMODO</u> <u>E I CONTROLLER SONO DIFFICILI</u>		
6	Qualche volta ti sei stancato/a? Se sì, quante volte? (Trascrivere risposta verbale)	 <u>A NEI DUELLA NUOVA ERO UN PO'</u> <u>STANCO</u>		
7	Qualche volta ti sei annoiato/a? Se sì, quante volte? (Trascrivere risposta verbale)	 <u>NO</u>		
8	Qualche volta Vlad ti è sembrato funzionare male? Se sì, in cosa e quante volte? (Trascrivere risposta verbale)			
9	Qualche volta ti sei arrabbiato/a o rattristato/a? Se sì, per cosa e quante volte? (Trascrivere anche risposta verbale)			

Vlad - QLike questionnaire, versione per adulti. Rel.1.0.0 – Pag. 1

		POCO	ABBASTANZA	MOLTO
10	C'è qualcosa in particolare che non ti piaciuto di Vlad? Cosa? (Trascrivere la risposta verbale)			
11	Alla fine della sessione d'uso hai avuto mal di testa o qualche malessere fisico? Se sì, cosa e quante volte? (Trascrivere anche risposta verbale)			
12	Preferisci l'uso di Vlad ai test fatti dando le risposte su fogli di carta o parlando ad una dottoressa o un dottore in persona?			
13	Ritorneresti per continuare questa esperienza in futuro?			
14	Consiglieresti ad altre persone l'uso di Vlad per il miglioramento della Creatività?			

Data di compilazione 19/5/2020

Periodo:

Iniziale

Intermedio

Finale

## QReq - Requirement sul servizio di training della Creatività - Adulto

Stiamo conducendo uno studio su come misurare e migliorare la creatività dei nostri pazienti. Ti chiedo, gentilmente, di aiutarci a svolgerci il nostro studio rispondendo alle domande che ti farò con sincerità. Chiedi tutti i chiarimenti che servono per comprendere bene le domande.

- 1) Hai mai svolto, in uno studio medico, test per valutare o migliorare l'attenzione, la memoria, la creatività? Si  No

Se sì, ti ricordi cosa ti veniva chiesto di fare? Puoi dare una o più delle seguenti risposte:

- dovevo rispondere a voce ad alcune domande
- dovevo scrivere su un foglio la risposta ad alcune domande
- dovevo rispondere ad alcune domande usando alcuni oggetti
- dovevo ascoltare un audio e/o osservare un video e dopo dare una risposta
- dovevo dare la risposta ad alcune domande usando un tablet o un computer
- dovevo giocare con una specie di videogame

- 2) Se dovessi svolgere un test per valutare o migliorare attenzione, memoria o creatività, come lo preferiresti? Dai un voto da 1 a 10 ai seguenti tipi di test (10 indica che ti piacerebbe molto, 1 che non ti piacerebbe per niente);

- devi rispondere a voce ad alcune domande 6
- devi scrivere su un foglio la risposta ad alcune domande 2
- devi rispondere ad alcune domande usando alcuni oggetti 5
- devi ascoltare un audio e/o osservare un video e dopo dare una risposta 7
- devi dare la risposta ad alcune domande usando un tablet o un computer 8
- devi giocare con una specie di videogame al computer 9

- 3) Ti piacerebbe svolgere alcuni test per valutare o migliorare attenzione, memoria o creatività che siano simili ad un gioco al computer con uno schermo in cui le immagini tridimensionali degli oggetti li facciano sembrare quasi reali?  sì  no

Se sì, saresti disposto a venire da noi per svolgere questi test?  sì  no

Se sì, quante volte alla settimana saresti disposto a venire da noi? Per quanti mesi?

2 VOLTE A SETTIMANA PER 2 MESI

Data di compilazione 11/9/2020

Periodo: Iniziale  Intermedio  Finale

## QLike - Questionario di gradimento sull'App Vlad - Adulto

Adesso ti rivolgerò alcune domande sulla esperienza d'uso della App di Realtà Virtuale Vlad per lo Storytelling e il miglioramento della Creatività. Ti chiedo, gentilmente, di rispondere alle domande con sincerità. Chiedi tutte le spiegazioni che servono per comprendere le domande.

Barrare con una "X" solo una tra le tre risposte possibili (per dire "poco" metti una "X" sullo smile rosso ; per "abbastanza", sullo smile giallo ; per "molto" usa lo smile verde ).

		POCO	ABBASTANZA	MOLTO
1	Ti è piaciuto usare l'App Vlad?			
2	Ti sei sentita/o a tuo agio nell'usare Vlad?			
3	Le istruzioni d'uso di Vlad erano facili da capire?			
4	Senti di aver imparato cose nuove e interessanti?			
5	C'è qualche aspetto di Vlad che ti ha dato fastidio nella procedura o nei dispositivi da utilizzare? (Trascrivere la risposta verbale)			
	<u>HO IMPARATO A VEDERE I CONTROLLER E A MUOVERMI, MA DEVO ANCORA ABITUARMI AL VISIONE</u>			
6	Qualche volta ti sei stancato/a? Se sì, quante volte? (Trascrivere risposta verbale)			
	<u>SOLO ALCA FINE DELLA SEDUTA</u>			
7	Qualche volta ti sei annoiato/a? Se sì, quante volte? (Trascrivere risposta verbale)			
	<u>NO</u>			
8	Qualche volta Vlad ti è sembrato funzionare male? Se sì, in cosa e quante volte? (Trascrivere risposta verbale)			
	<u>---</u>			
9	Qualche volta ti sei arrabbiato/a o rattristato/a? Se sì, per cosa e quante volte? (Trascrivere anche risposta verbale)			
	<u>AI RAPPORTI DI SENTIMENTI COMUNICO</u>			

		POCO	ABBASTANZA	MOLTO
10	C'è qualcosa in particolare che non ti piaciuto di Vlad? Cosa? (Trascrivere la risposta verbale) <i>Vlad ha più spazio</i>			
11	Alla fine della sessione d'uso hai avuto mal di testa o qualche malessere fisico? Se sì, cosa e quante volte? (Trascrivere anche risposta verbale)			
12	Preferisci l'uso di Vlad ai test fatti dando le risposte su fogli di carta o parlando ad una dottoressa o un dottore in persona?			
13	Ritorneresti per continuare questa esperienza in futuro?			
14	Consiglieresti ad altre persone l'uso di Vlad per il miglioramento della Creatività?			

Data di compilazione 1/9/2020

Periodo:

Iniziale

Intermedio

Finale

## QReq - Requirement sul servizio di training della Creatività - Adulto

Stiamo conducendo uno studio su come misurare e migliorare la creatività dei nostri pazienti. Ti chiedo, gentilmente, di aiutarci a svolgerci il nostro studio rispondendo alle domande che ti farò con sincerità. Chiedi tutti i chiarimenti che servono per comprendere bene le domande.

- 1) Hai mai svolto, in uno studio medico, test per valutare o migliorare l'attenzione, la memoria, la creatività?     Si     No

Se sì, ti ricordi cosa ti veniva chiesto di fare? Puoi dare una o più delle seguenti risposte:

- dovevo rispondere a voce ad alcune domande
- dovevo scrivere su un foglio la risposta ad alcune domande
- dovevo rispondere ad alcune domande usando alcuni oggetti
- dovevo ascoltare un audio e/o osservare un video e dopo dare una risposta
- dovevo dare la risposta ad alcune domande usando un tablet o un computer
- dovevo giocare con una specie di videogame

- 2) Se dovessi svolgere un test per valutare o migliorare attenzione, memoria o creatività, come lo preferiresti? Dai un voto da 1 a 10 ai seguenti tipi di test (10 indica che ti piacerebbe molto, 1 che non ti piacerebbe per niente);

- devi rispondere a voce ad alcune domande \_\_\_\_\_ 7
- devi scrivere su un foglio la risposta ad alcune domande \_\_\_\_\_ 3
- devi rispondere ad alcune domande usando alcuni oggetti \_\_\_\_\_ 5
- devi ascoltare un audio e/o osservare un video e dopo dare una risposta \_\_\_\_\_ 7
- devi dare la risposta ad alcune domande usando un tablet o un computer \_\_\_\_\_ 10
- devi giocare con una specie di videogame al computer \_\_\_\_\_ 10

- 3) Ti piacerebbe svolgere alcuni test per valutare o migliorare attenzione, memoria o creatività che siano simili ad un gioco al computer con uno schermo in cui le immagini tridimensionali degli oggetti li facciano sembrare quasi reali?     sì     no

Se sì, saresti disposto a venire da noi per svolgere questi test?  sì     no

Se sì, quante volte alla settimana saresti disposto a venire da noi? Per quanti mesi?

3 VOLTI A SETTIMANA PER 6 MESI

Data di compilazione 21/10/2020

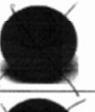
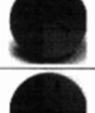
Periodo:                  Iniziale                   Intermedio                   Finale

## QLike - Questionario di gradimento sull'App Vlad - Adulto

Adesso ti rivolgerò alcune domande sulla esperienza d'uso della App di Realtà Virtuale Vlad per lo Storytelling e il miglioramento della Creatività. Ti chiedo, gentilmente, di rispondere alle domande con sincerità. Chiedi tutte le spiegazioni che servono per comprendere le domande.

Barrare con una "X" solo una tra le tre risposte possibili (per dire "poco" metti una "X" sullo smile rosso ; per "abbastanza", sullo smile giallo ; per "molto" usa lo smile verde ).

		POCO	ABBASTANZA	MOLTO
1	Ti è piaciuto usare l'App Vlad?			
2	Ti sei sentita/o a tuo agio nell'usare Vlad?			
3	Le istruzioni d'uso di Vlad erano facili da capire?			
4	Senti di aver imparato cose nuove e interessanti?			
5	C'è qualche aspetto di Vlad che ti ha dato fastidio nella procedura o nei dispositivi da utilizzare? (Trascrivere la risposta verbale)	 <u>RARAMENTE FA ORO VERTIGINI</u>		
6	Qualche volta ti sei stancato/a? Se sì, quante volte? (Trascrivere risposta verbale)	 <u>UNA O DUE VOLTE</u>		
7	Qualche volta ti sei annoiato/a? Se sì, quante volte? (Trascrivere risposta verbale)	 <u>VOLTI SAPER CREARE STORIE PIÙ AVVENTURE</u>		
8	Qualche volta Vlad ti è sembrato funzionare male? Se sì, in cosa e quante volte? (Trascrivere risposta verbale)	 <u>NO</u>		
9	Qualche volta ti sei arrabbiato/a o rattristato/a? Se sì, per cosa e quante volte? (Trascrivere anche risposta verbale)	 <u>MI CAPITA DI IMPRESERMI</u>		

		POCO	ABBASTANZA	MOLTO
10	C'è qualcosa in particolare che non ti piaciuto di Vlad? Cosa? (Trascrivere la risposta verbale) <u>VIAVI NEL AMBIENTE</u>			
11	Alla fine della sessione d'uso hai avuto mal di testa o qualche malessere fisico? Se sì, cosa e quante volte? (Trascrivere anche risposta verbale) <u>No</u>			
12	Preferisci l'uso di Vlad ai test fatti dando le risposte su fogli di carta o parlando ad una dottoressa o un dottore in persona?			
13	Ritorneresti per continuare questa esperienza in futuro?			
14	Consiglieresti ad altre persone l'uso di Vlad per il miglioramento della Creatività?			

Data di compilazione 2/10/2020

Periodo:

Iniziale

Intermedio

Finale

QSkill - Questionario di alfabetizzazione informatica - Adulto

Adesso ti rivolgerò alcune domande che riguardano l'uso del computer, del telefono cellulare e di altre tecnologie della comunicazione. Ti chiedo di rispondere alle domande con sincerità. Chiedi tutte le spiegazioni che servono per comprendere bene le domande.

1) A casa o dove vivi ti capita o ti capitava di usare un computer? Sì  No

Se sì, quante volte alla settimana (tutti i giorni, etc.)? TUTTI I GIORNI

Per quanti minuti al giorno circa (nei giorni in cui lo usi)? 6 ORE CIRCA

Che cosa fai (facevi) quando usi (usavi) il computer? (Videogame, navigazione su Internet, Skype, Facebook o altri Social Network, Skype, posta elettronica, chat, Youtube, Radio, etc.)

SKYPE, POSTA ELETTRONICA, FACEBOOK, PROGRAMMI OFFICE  
NAVIGAZIONE INTERNET

2) A casa o dove vivi ti capita o ti capitava di usare un Tablet? Sì  No

Se sì, quante volte alla settimana (tutti i giorni, etc.)?

Per quanti minuti al giorno circa (nei giorni in cui lo usi)?

Che cosa fai (facevi) quando usi (usavi) il tablet? (Videogame, navigazione su Internet, Facebook, Skype, posta elettronica, chat, Youtube, radio, etc.).

3) Ti capita o ti capitava di usare un telefono cellulare? Sì  No

Se sì, era il tuo telefono cellulare personale? Sì  No

Quante volte alla settimana usi o usavi il telefono cellulare (tutti i giorni, etc.)? TUTTI I GIORNI

Circa per quanti minuti al giorno (nei giorni in cui lo usi o lo usavi)? 2 ORE

Che cosa fai quando usi il telefono cellulare? (Messaggi, Chiamate Telefoniche, Videogame, Skype, navigazione su Internet, Facebook, Posta Elettronica, Chat, Youtube, radio, etc.)

CHAT, NAVIGAZIONE INTERNET, FACEBOOK, POSTA ELETTRONICA  
SKYPE, CHIAMATE

Sei a tuo agio nell'utilizzo della modalità touchscreen, se ti è capitato di provarla? (Toccare lo schermo con le dita per selezionare opzioni, navigare in Internet, etc.)? Sì  No

4) Partecipi o hai partecipato a corsi di informatica? Sì  No

5) Sai usare o sapevi usare il telecomando per programmare i canali dell'antenna dopo averlo acquistato o quando se ne manifestava il bisogno (RAI1, RAI2, RAI3 etc.)? Sì  No

Sul televisore usi o usavi televideo per acquisire informazioni utili sul tempo, sui programmi televisivi della settimana, etc.? Sì  No

Data di compilazione 26/05/2020

Periodo: Iniziale  Intermedio  Finale

Vlad - QSkill questionnaire, versione per adulti. Rel.1.0.0 – Pag. 1

## QReq - Requirement sul servizio di training della Creatività - Adulto

Stiamo conducendo uno studio su come misurare e migliorare la creatività dei nostri pazienti. Ti chiedo, gentilmente, di aiutarci a svolgerci il nostro studio rispondendo alle domande che ti farò con sincerità. Chiedi tutti i chiarimenti che servono per comprendere bene le domande.

- 1) Hai mai svolto, in uno studio medico, test per valutare o migliorare l'attenzione, la memoria, la creatività?      Si       No

Se sì, ti ricordi cosa ti veniva chiesto di fare? Puoi dare una o più delle seguenti risposte:

- dovevo rispondere a voce ad alcune domande
- dovevo scrivere su un foglio la risposta ad alcune domande
- dovevo rispondere ad alcune domande usando alcuni oggetti
- dovevo ascoltare un audio e/o osservare un video e dopo dare una risposta
- dovevo dare la risposta ad alcune domande usando un tablet o un computer
- dovevo giocare con una specie di videogame

- 2) Se dovessi svolgere un test per valutare o migliorare attenzione, memoria o creatività, come lo preferiresti? Dai un voto da 1 a 10 ai seguenti tipi di test (10 indica che ti piacerebbe molto, 1 che non ti piacerebbe per niente);

- devi rispondere a voce ad alcune domande \_\_\_\_\_ 6
- devi scrivere su un foglio la risposta ad alcune domande \_\_\_\_\_ 4
- devi rispondere ad alcune domande usando alcuni oggetti \_\_\_\_\_ 6
- devi ascoltare un audio e/o osservare un video e dopo dare una risposta \_\_\_\_\_ 4
- devi dare la risposta ad alcune domande usando un tablet o un computer \_\_\_\_\_ 8
- devi giocare con una specie di videogame al computer \_\_\_\_\_ 8

- 3) Ti piacerebbe svolgere alcuni test per valutare o migliorare attenzione, memoria o creatività che siano simili ad un gioco al computer con uno schermo in cui le immagini tridimensionali degli oggetti li facciano sembrare quasi reali?       sì       no

Se sì, saresti disposto a venire da noi per svolgere questi test?  sì       no

Se sì, quante volte alla settimana saresti disposto a venire da noi? Per quanti mesi?

1 VOLTA A SETTIMANA X 2 MESI

Data di compilazione 22/05/2020

Periodo:      Iniziale       Intermedio       Finale

## QLike - Questionario di gradimento sull'App Vlad - Adulto

Adesso ti rivolgerò alcune domande sulla esperienza d'uso della App di Realtà Virtuale Vlad per lo Storytelling e il miglioramento della Creatività. Ti chiedo, gentilmente, di rispondere alle domande con sincerità. Chiedi tutte le spiegazioni che servono per comprendere le domande.

*Barrare con una "X" solo una tra le tre risposte possibili (per dire "poco" metti una "X" sullo smile rosso ; per "abbastanza", sullo smile giallo ; per "molto" usa lo smile verde ).*

		POCO	ABBASTANZA	MOLTO
1	Ti è piaciuto usare l'App Vlad?			
2	Ti sei sentita/o a tuo agio nell'usare Vlad?			
3	Le istruzioni d'uso di Vlad erano facili da capire?			
4	Senti di aver imparato cose nuove e interessanti?			
5	C'è qualche aspetto di Vlad che ti ha dato fastidio nella procedura o nei dispositivi da utilizzare? (Trascrivere la risposta verbale)			
	<u>IL DISORE MI FA VENIRE LE VERTIGI</u>			
6	Qualche volta ti sei stancato/a? Se sì, quante volte? (Trascrivere risposta verbale)			
	<u>SOLO ALLA FINE</u>			
7	Qualche volta ti sei annoiato/a? Se sì, quante volte? (Trascrivere risposta verbale)			
	<u>NO</u>			
8	Qualche volta Vlad ti è sembrato funzionare male? Se sì, in cosa e quante volte? (Trascrivere risposta verbale)			
	<u>---</u>			
9	Qualche volta ti sei arrabbiato/a o rattristato/a? Se sì, per cosa e quante volte? (Trascrivere anche risposta verbale)			
	<u>---</u>			

Vlad - QLike questionnaire, versione per adulti. Rel.1.0.0 – Pag. 1

		POCO	ABBASTANZA	MOLTO
10	C'è qualcosa in particolare che non ti piaciuto di Vlad? Cosa? (Trascrivere la risposta verbale)  _____ _____ _____			
11	Alla fine della sessione d'uso hai avuto mal di testa o qualche malessere fisico? Se sì, cosa e quante volte? (Trascrivere anche risposta verbale)  <u>sì ALLA FINE</u>			
12	Preferisci l'uso di Vlad ai test fatti dando le risposte su fogli di carta o parlando ad una dottoressa o un dottore in persona?			
13	Ritorneresti per continuare questa esperienza in futuro?			
14	Consiglieresti ad altre persone l'uso di Vlad per il miglioramento della Creatività?			

Data di compilazione 22/05/2020

Periodo:

Iniziale

Intermedio

Finale

## QReq - Requirement sul servizio di training della Creatività - Adulto

Stiamo conducendo uno studio su come misurare e migliorare la creatività dei nostri pazienti. Ti chiedo, gentilmente, di aiutarci a svolgerci il nostro studio rispondendo alle domande che ti farò con sincerità. Chiedi tutti i chiarimenti che servono per comprendere bene le domande.

- 1) Hai mai svolto, in uno studio medico, test per valutare o migliorare l'attenzione, la memoria, la creatività?      Si       No

Se sì, ti ricordi cosa ti veniva chiesto di fare? Puoi dare una o più delle seguenti risposte:

- dovevo rispondere a voce ad alcune domande
- dovevo scrivere su un foglio la risposta ad alcune domande
- dovevo rispondere ad alcune domande usando alcuni oggetti
- dovevo ascoltare un audio e/o osservare un video e dopo dare una risposta
- dovevo dare la risposta ad alcune domande usando un tablet o un computer
- dovevo giocare con una specie di videogame

- 2) Se dovessi svolgere un test per valutare o migliorare attenzione, memoria o creatività, come lo preferiresti? Dai un voto da 1 a 10 ai seguenti tipi di test (10 indica che ti piacerebbe molto, 1 che non ti piacerebbe per niente);

- devi rispondere a voce ad alcune domande \_\_\_\_\_ 7
- devi scrivere su un foglio la risposta ad alcune domande \_\_\_\_\_ 3
- devi rispondere ad alcune domande usando alcuni oggetti \_\_\_\_\_ 6
- devi ascoltare un audio e/o osservare un video e dopo dare una risposta \_\_\_\_\_ 5
- devi dare la risposta ad alcune domande usando un tablet o un computer \_\_\_\_\_ 7
- devi giocare con una specie di videogame al computer \_\_\_\_\_ 9

- 3) Ti piacerebbe svolgere alcuni test per valutare o migliorare attenzione, memoria o creatività che siano simili ad un gioco al computer con uno schermo in cui le immagini tridimensionali degli oggetti li facciano sembrare quasi reali?       sì       no

Se sì, saresti disposto a venire da noi per svolgere questi test?  sì       no

Se sì, quante volte alla settimana saresti disposto a venire da noi? Per quanti mesi?

I VOLTA A SETTIMANA PER 2 MESI

Data di compilazione 04/09/2020

Periodo:      Iniziale       Intermedio       Finale

## QLike - Questionario di gradimento sull'App Vlad - Adulto

Adesso ti rivolgerò alcune domande sulla esperienza d'uso della App di Realtà Virtuale Vlad per lo Storytelling e il miglioramento della Creatività. Ti chiedo, gentilmente, di rispondere alle domande con sincerità. Chiedi tutte le spiegazioni che servono per comprendere le domande.

Barrare con una "X" solo una tra le tre risposte possibili (per dire "poco" metti una "X" sullo smile rosso ☹; per "abbastanza", sullo smile giallo ☺; per "molto" usa lo smile verde ☻).

		POCO	ABBASTANZA	MOLTO
1	Ti è piaciuto usare l'App Vlad?	☹	☺	☻
2	Ti sei sentita/o a tuo agio nell'usare Vlad?	☹	☺	☻
3	Le istruzioni d'uso di Vlad erano facili da capire?	☹	☺	☻
4	Senti di aver imparato cose nuove e interessanti?	☹	☺	☻
5	C'è qualche aspetto di Vlad che ti ha dato fastidio nella procedura o nei dispositivi da utilizzare? (Trascrivere la risposta verbale)	☹	☺	☻
	<u>IL VISORE MI DA MENO FASTIDIO DI PRIMA</u>			
6	Qualche volta ti sei stancato/a? Se sì, quante volte? (Trascrivere risposta verbale)	☹	☺	☻
	<u>RARAMENTE ALLA FINE</u>			
7	Qualche volta ti sei annoiato/a? Se sì, quante volte? (Trascrivere risposta verbale)	☹	☺	☻
	<u>HO</u>			
8	Qualche volta Vlad ti è sembrato funzionare male? Se sì, in cosa e quante volte? (Trascrivere risposta verbale)	☹	☺	☻
	<u>SEmpre</u>			
9	Qualche volta ti sei arrabbiato/a o rattristato/a? Se sì, per cosa e quante volte? (Trascrivere anche risposta verbale)	☹	☺	☻
	<u>Mi AVVINCCE</u>			

Vlad - QLike questionnaire, versione per adulti. Rel.1.0.0 – Pag. 1

		POCO	ABBASTANZA	MOLTO
10	C'è qualcosa in particolare che non ti piaciuto di Vlad? Cosa? (Trascrivere la risposta verbale) <u>LO VOGLIO IN CHIAVE PIÙ MODERNA</u>			
11	Alla fine della sessione d'uso hai avuto mal di testa o qualche malessere fisico? Se sì, cosa e quante volte? (Trascrivere anche risposta verbale) <u>SI ALLA FINE</u>			
12	Preferisci l'uso di Vlad ai test fatti dando le risposte su fogli di carta o parlando ad una dottoressa o un dottore in persona?			
13	Ritorneresti per continuare questa esperienza in futuro?			
14	Consiglieresti ad altre persone l'uso di Vlad per il miglioramento della Creatività?			

Data di compilazione \_\_\_\_\_

Periodo:

Iniziale

Intermedio

Finale

## QReq - Requirement sul servizio di training della Creatività - Adulto

Stiamo conducendo uno studio su come misurare e migliorare la creatività dei nostri pazienti. Ti chiedo, gentilmente, di aiutarci a svolgerci il nostro studio rispondendo alle domande che ti farò con sincerità. Chiedi tutti i chiarimenti che servono per comprendere bene le domande.

- 1) Hai mai svolto, in uno studio medico, test per valutare o migliorare l'attenzione, la memoria, la creatività?     Sì     No

Se sì, ti ricordi cosa ti veniva chiesto di fare? Puoi dare una o più delle seguenti risposte:

- dovevo rispondere a voce ad alcune domande
- dovevo scrivere su un foglio la risposta ad alcune domande
- dovevo rispondere ad alcune domande usando alcuni oggetti
- dovevo ascoltare un audio e/o osservare un video e dopo dare una risposta
- dovevo dare la risposta ad alcune domande usando un tablet o un computer
- dovevo giocare con una specie di videogame

- 2) Se dovessi svolgere un test per valutare o migliorare attenzione, memoria o creatività, come lo preferiresti? Dai un voto da 1 a 10 ai seguenti tipi di test (10 indica che ti piacerebbe molto, 1 che non ti piacerebbe per niente);

- devi rispondere a voce ad alcune domande \_\_\_\_\_ 8
- devi scrivere su un foglio la risposta ad alcune domande \_\_\_\_\_ 3
- devi rispondere ad alcune domande usando alcuni oggetti \_\_\_\_\_ 6
- devi ascoltare un audio e/o osservare un video e dopo dare una risposta \_\_\_\_\_ 4
- devi dare la risposta ad alcune domande usando un tablet o un computer \_\_\_\_\_ 8
- devi giocare con una specie di videogame al computer \_\_\_\_\_ 10

- 3) Ti piacerebbe svolgere alcuni test per valutare o migliorare attenzione, memoria o creatività che siano simili ad un gioco al computer con uno schermo in cui le immagini tridimensionali degli oggetti li facciano sembrare quasi reali?     sì     no

Se sì, saresti disposto a venire da noi per svolgere questi test?  sì     no

Se sì, quante volte alla settimana saresti disposto a venire da noi? Per quanti mesi?

2 VOLTE A SETTIMANA X 1 MESI

Data di compilazione 08/10/2020

Periodo:                  Iniziale                   Intermedio                   Finale

## QLike - Questionario di gradimento sull'App Vlad - Adulto

Adesso ti rivolgerò alcune domande sulla esperienza d'uso della App di Realtà Virtuale Vlad per lo Storytelling e il miglioramento della Creatività. Ti chiedo, gentilmente, di rispondere alle domande con sincerità. Chiedi tutte le spiegazioni che servono per comprendere le domande.

Barrare con una "X" solo una tra le tre risposte possibili (per dire "poco" metti una "X" sullo smile rosso ; per "abbastanza", sullo smile giallo ; per "molto" usa lo smile verde ).

		POCO	ABBASTANZA	MOLTO
1	Ti è piaciuto usare l'App Vlad?			
2	Ti sei sentita/o a tuo agio nell'usare Vlad?			
3	Le istruzioni d'uso di Vlad erano facili da capire?			
4	Senti di aver imparato cose nuove e interessanti?			
5	C'è qualche aspetto di Vlad che ti ha dato fastidio nella procedura o nei dispositivi da utilizzare? <i>(Trascrivere la risposta verbale)</i> <u>QUASI PER NIENTE</u>			
6	Qualche volta ti sei stancato/a? Se sì, quante volte? (Trascrivere risposta verbale) <u>NO PIÙ</u>			
7	Qualche volta ti sei annoiato/a? Se sì, quante volte? (Trascrivere risposta verbale)			
8	Qualche volta Vlad ti è sembrato funzionare male? Se sì, in cosa e quante volte? (Trascrivere risposta verbale) <u>NO</u>			
9	Qualche volta ti sei arrabbiato/a o rattristato/a? Se sì, per cosa e quante volte? (Trascrivere anche risposta verbale) <u>MI SENTO MOLTO COINVOLTA</u>			

		POCO	ABBASTANZA	MOLTO
10	C'è qualcosa in particolare che non ti piaciuto di Vlad? Cosa? (Trascrivere la risposta verbale) <u>VORREI PIÙ SCELTA</u>			
11	Alla fine della sessione d'uso hai avuto mal di testa o qualche malessere fisico? Se sì, cosa e quante volte? (Trascrivere anche risposta verbale) <u>no</u>			
12	Preferisci l'uso di Vlad ai test fatti dando le risposte su fogli di carta o parlando ad una dottoressa o un dottore in persona?			
13	Ritorneresti per continuare questa esperienza in futuro?			
14	Consiglieresti ad altre persone l'uso di Vlad per il miglioramento della Creatività?			

Data di compilazione 08/01/2020

Periodo:

Iniziale

Intermedio

Finale