

## Locus of Control behavior in ultra-high risk patients

MICHELE RIBOLSI<sup>1</sup>, GIULIANO ALBERGO<sup>1</sup>, FRANCESCA LEONETTI<sup>1</sup>, CINZIA NIOLU<sup>2</sup>, VINCENZO DI LAZZARO<sup>1</sup>, ALBERTO SIRACUSANO<sup>2</sup>, GIORGIO DI LORENZO<sup>2,3</sup>

<sup>1</sup>Unit of Neurology, Neurophysiology, Neurobiology and Psychiatry, Department of Medicine, University Campus Bio-Medico of Rome, Italy; <sup>2</sup>Department of Systems Medicine, University of Rome Tor Vergata, Rome, Italy; <sup>3</sup>IRCCS-Fondazione Santa Lucia, Rome, Italy.

**Summary.** The term “Locus of Control” has been defined by Rotter (1954) as a general attitude regarding the nature of the causal relationship between one’s behavior and its consequences. External Locus of Control Behavior represents an important factor of psychopathological vulnerability and can increase people’s vulnerability to psychosis. Using the Craig Scale (1984), we investigated the Locus of Control Behavior in a sample of patients at high risk of psychosis compared to schizophrenia patients and mood disorder patients. Furthermore, we investigated the possible correlation between an external Locus of Control and psychopathological dimensions such as aberrant salience, and attenuated positive and negative symptoms.

**Key words.** Locus of control, mood, paranoia, schizophrenia, ultra-high risk.

*Locus of control behavior in pazienti ultra-high risk.*

**Riassunto.** Il termine “Locus of Control” è stato definito da Rotter (1954) come una generale attitudine rispetto alla relazione di causalità tra il comportamento di un individuo e le sue conseguenze. Un Locus of Control Behavior esterno rappresenta un importante fattore di vulnerabilità psicopatologica e può incrementare la vulnerabilità alla psicosi. Usando la scala di Craig (1984), abbiamo investigato il Locus of Control Behavior in un campione di pazienti a rischio di psicosi rispetto a pazienti con schizofrenia e con disturbi dell’umore. Inoltre, abbiamo investigato la possibile correlazione tra un Locus of Control esterno e dimensioni psicopatologiche come la salienza aberrante, i sintomi positivi e negativi attenuati.

**Parole chiave.** Locus of control, paranoia, schizofrenia, ultra-high risk, umore.

### Introduction

The term “Locus of Control” (LOC) literally means “the place through which control is exercised”. This concept was originally introduced by Rotter (1954) and has been defined as a «general attitude, belief or expectation regarding the nature of the causal relationship between one’s behavior and its consequences»<sup>1,2</sup>.

It represents a one-dimensional construct characterized by a continuum with two poles, interiority and exteriority, thus dividing the individuals who attribute the causes of their life events to themselves (internal LOC) and those who attribute them to external and uncontrollable circumstances (external LOC). While the first one feels able to influence actions, people, and events, subjects with external LOC may have a fatalistic vision and are frequently subjected to greater stress because they have the perception of not having control over events<sup>3</sup>.

According to the “theory of social learning”<sup>1</sup>, these processes are not innate but are acquired over time through a model of reinforcements. For example, a sense of internal control develops as a result of previous social interactions in which one’s actions on the environment are reinforced. The type of locus of control of an individual is therefore influenced by

various factors: personality, culture, family, and the different reinforcements, positive or negative, that are received during the course of life. External LOC represents an important factor of psychopathological vulnerability and it plays a fundamental role in the etiology of various psychiatric disorders<sup>4</sup>.

External LOC can determine people’s vulnerability to psychosis. According to current theories, delusions, a central symptom of psychosis, arise from attempts to explain abnormal experiences: individuals who tend to explain disturbing events in terms of external causes may be more prone to develop delusional beliefs about such events. This “externalizing” bias to avoid self-blame can therefore promote greater vulnerability to psychosis, particularly paranoid psychosis, where it serves as a defense against low self-esteem<sup>5,6</sup>.

Preliminary investigations showed that pre-existing externalizing bias can favor the onset of suspicious delusional ideas among youth at risk of psychosis<sup>7,8</sup>. The bias to view life circumstances as uncontrollable can produce a persistent state of psychological distress, particularly for young people at high risk for psychosis, causing greater vulnerability to persistent stress and, consequently, accelerating the progression of the disease.

Similarly, patients with first-episode psychosis often exhibit dysfunctional coping patterns, poor

self-efficacy, and external LOC. A cohort study<sup>9</sup> based on 7058 participants investigated longitudinal associations between social cognitive ability and external LOC. The results highlighted an association between an external LOC and the presence of psychotic experiences at 12 and 18 years of follow-up.

Over the years, different scales have been proposed to assess the size of the internal or external LOC. Kirsht<sup>10</sup> developed one focusing on perceived control in relation to one's health. Levenson<sup>11</sup> proposed one consisting of 24 items and divided it into three subscales, as well as that of Reid and Ware<sup>12</sup> which was aimed at studying three different factors: fatalism, socio-political influence, and self-control. Finally, Wallston et al.<sup>13</sup> described another based on the same element of Kirsht's study. More recently, Henry<sup>14</sup> has developed a questionnaire consisting of three subscales: internal control, external control, and control by other authoritative subjects. Furthermore, this is structured according to the language of the Structural Analysis of Social Behavior (SASB)<sup>15</sup>.

In 1984, Craig et al.<sup>16</sup> developed a 17-item Likert-type scale to measure the Locus of Control Behavior (LCB). The LCB also appeared to have, unlike other questionnaires with the same content, a higher predictive value with respect to the outcome of the therapies: Craig et al. identified the decrease in the global score between the beginning and the end of the therapy, as a positive factor to prognostic level.

To date, there are no studies that have investigated LOC according to the Craig scale in patients at high risk of psychosis. Our work aims to study the LCB in a group of patients at high risk of psychosis compared to schizophrenia patients and control patients with

mood disorders. In addition, we investigated the possible correlation between an external LOC and psychopathological dimensions such as aberrant salience and attenuated positive and negative symptoms. Attenuated psychotic symptoms were assessed both by self-report measures and by scales compiled after semi-structured interviews. Aberrant salience was investigated using self-report measures. Preliminary studies have shown that aberrant salience correlates with the possible onset of thought disorders among community-based adolescents and can be considered an additional screening tool for assessing at-risk mental states. Therefore, it may be useful to evaluate a possible correlation between high levels of aberrant salience and the presence of an external LOC in UHR patients.

## Methods

The study population is made up of 72 subjects, recruited from the Psychiatric Unit of the University Hospital Campus Bio-Medico in Rome. Specifically, 18 patients diagnosed with schizophrenia (SCZ), 18 patients with a diagnosis of ultra-high risk for psychosis (UHR), 18 patients with mood disorders (MOOD), and 18 healthy subjects (HS) were recruited. Each diagnosis was made according to DSM-5 criteria.

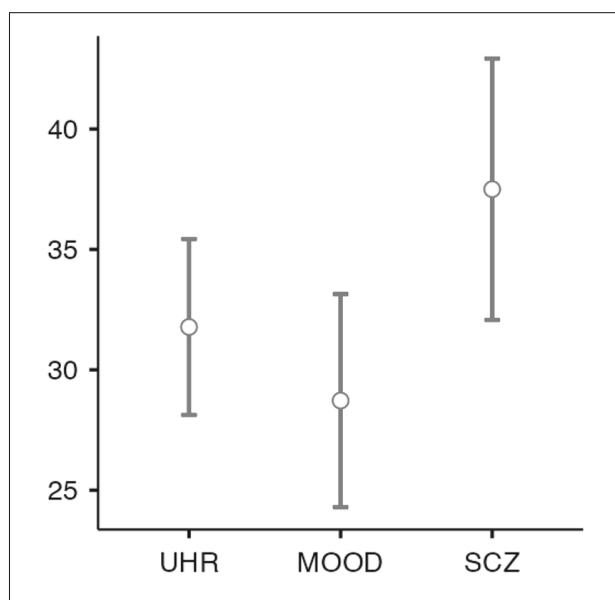
Exclusion criteria were: current substance use and the presence of relevant neurological comorbidities. Patients with MOOD and SCZ between the ages of 18 and 60 were recruited. The age group of UHR patients was between 13 and 21 years old. The Structured Interview for Prodromal Syndromes (SIPS) and Scale of Prodromal Syndromes (SOPS) were used for the diagnosis of UHR<sup>17</sup>.

The UHR sample of patients was subjected to psychometric assessment by means of: CAPE (Community Assessment of Psychic Experiences)<sup>18</sup>; ASI (Aberrant Salience Inventory)<sup>19</sup>; the Italian version of LCB<sup>16,20</sup>.

Each questionnaire was completed by the patients independently, without time limits. The examiner intervened only at the end of the compilation for the evaluation of scores and, in a few cases, during the execution of the test where patients encountered difficulties in interpreting the questions.

## STATISTICS

The statistical analysis of the comparison between the three groups was conducted using the one-way analysis of variance (one-way ANOVA). Pearson correlation coefficient was calculated to evaluate the correlation between the LCB score and the other psychopathological dimensions. A p-value less than 0.05 ( $\leq 0.05$ ) was considered statistically significant.



**Figure 1.** The mean LCB score of the SCZ group was  $37.5 \pm 10.91$ , while the mean LCB score of the UHR group was  $31.8 \pm 7.34$  and the mean LCB score of the MOOD group was  $28.7 \pm 8.90$ .

**Table 1.** Comparisons between groups.

$G_{SCZ} : G_{UHR}$	$M_1 = 37.50$ $M_2 = 31.78$	$p = 0.19177$
$G_{SCZ} : G_{MOOD}$	$M_1 = 37.50$ $M_3 = 29.00$	<b><math>p = 0.01946</math></b>
$G_{SCZ} : G_{HS}$	$M_1 = 37.50$ $M_4 = 22.39$	<b><math>p = 0.00001</math></b>
$G_{UHR} : G_{MOOD}$	$M_2 = 31.78$ $M_3 = 29.00$	$p = 0.76165$
$G_{UHR} : G_{HS}$	$M_2 = 31.78$ $M_4 = 22.39$	<b><math>p = 0.00796</math></b>
$G_{MOOD} : G_{HS}$	$M_3 = 29.00$ $M_4 = 22.39$	$p = 0.10112$

Legend: G= group; M= mean LCB score.

## Results

The mean LCB score of the SCZ group was  $37.5 \pm 10.91$ , while the mean LCB score of the UHR group was  $31.78 \pm 7.34$  and the mean LCB score of the MOOD group was  $29 \pm 8.90$ . The mean LCB score of the HS group was  $22.39 \pm 6.37$ .

The one-way analysis of variance (Welch's) showed the presence of a statistically significant difference between the three groups ( $F = 9.79$ ;  $p < 0.001$ ).

In particular, the Tukey Post-Hoc test shows that the SCZ group has an LCB score significantly higher than that of the MOOD group ( $p = 0.01$ ). Although the UHR group is placed in an intermediate position between the SCZ group and the MOOD group, there is no statistically significant difference in terms of LCB score compared to SCZ ( $p = 0.19$ ) and MOOD patients ( $p = 0.76$ ). Both SCZ and UHR groups have an LCB score significantly higher than the HS group (table 1).

In the UHR sample, a statistically significant correlation also emerged between the LCB scores and negative symptoms ( $R = 0.46$ ;  $p = 0.04$ ), while a trend emerged with the positive ( $R = 0.41$ ;  $p = 0.09$ ) and depressive dimension ( $R = 0.41$ ;  $p = 0.08$ ) of the CAPE, although a statistically significant difference is not achieved. There was no statistically significant correlation between LCB and ASI ( $R = 0.26$ ;  $p = 0.29$ ), between LCB and SOPS Positive Scale ( $R = 0.01$ ), between LCB and SOPS Negative Scale ( $R = -0.24$ ;  $p = 0.32$ ).

## Discussion

The objective of our study was to investigate the presence of an external LCB and its psychopathological correlates in a sample of UHR patients compared to two other clinical groups, namely SCZ patients and MOOD patients. To our knowledge, this is the first study that directly investigates this comparison.

We hypothesized that an external LCB may be evident not only in overt psychopathological syndromes, but also in UHR patients. In particular, we found a statistically significant difference between the three groups: the SCZ group scores were significantly higher than the MOOD group with the UHR patients in an intermediate position between the SCZ group and the MOOD group. In summary, UHR patients exhibit a more external LCB than MOOD patients, but they don't reach the level of SCZ patients as they have not yet fully converted to full-blown psychosis. Based on these preliminary results, it should be interesting to investigate the presence of an external LOC as an additional screening tool for evaluating psychotic vulnerability.

The data we collected are in line with the existing literature. For example, it has been shown that pre-existing externalizing bias can favor the onset of suspicious delusional themes in vulnerable young people at risk of psychosis<sup>7</sup>. Other studies have correlated the presence of an external LOC with an increase in perceived social stress<sup>8</sup> and with the level of social cognitive skills<sup>9</sup>. Overall, our data confirm the hypothesis that an external LOC is a key mechanism for understanding the cognitive development of psychotic symptoms, especially paranoid symptoms<sup>21</sup>.

However, it must be emphasized that in this area the existing literature is fragmented, precisely because of the heterogeneity of the tools. Our study is the first to propose the LCB scale as a possible tool to accurately and rapidly investigate the presence of an external attributional bias in UHR patients. Furthermore, in the sample of UHR patients, we found a clinically relevant correlation with all CAPE dimensions, although statistical significance is only achieved in relation to negative symptoms. This clinical correlation may be linked to the greater tendency of these patients to develop a significant impairment of interpersonal relationships, and social and work functioning. However, the small sample size does not allow definitive conclusions to be drawn.

*Conflict of interests:* the authors have no conflict of interests to declare.

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Corresponding author:  
Dr. Michele Ribolsi  
Unit of Neurology, Neurophysiology, Neurobiology and  
Psychiatry  
Department of Medicine  
University Campus Bio-Medico of Rome  
Via Álvaro del Portillo 21  
00128 Rome, Italy  
E-mail: michele.ribolsi@policlinicocampus.it