

Coping strategies and *locus* of control in childhood leukemia: a multi-center research

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Abstract

Acute lymphoblastic leukemia (ALL) is a very distressing experience for children and requires a special effort of adjustment. Therefore, it seems to be crucial to explore coping resources for the experienced risk condition. In this sense, the study focuses on coping strategies and *locus* of control in children with ALL during the treatment phase, and on their possible relation. The correlation between children and maternal coping strategies is also investigated. The participants involved were an experimental group of 40 children with ALL and their mothers, and 30 healthy children as the control group. The tools used were: the Child Behavioral Style Scale and the Monitor-Blunter Style Scale to assess the coping strategies of children and mothers; the *locus* of Control Scale for Children to analyze the children's perception of controlling the events. Both children with ALL and their mothers resorted to monitoring coping strategies with a statistically significant rate of occurrence (children: $M=17.8$, $SD=3.8$; mothers: $M=10.48$, $SD=3.4$). The data concerning the *locus* of control show this tendency towards internal causes ($M=53.1$, $SD=4.7$). There were statistically significant correlations between monitoring coping strategies and external *locus* of control ($r=0.400$, $P<0.05$). The results gained from the control group are almost equivalent. The outcomes show several interesting resources of the psychological functioning of children as well as of their mothers.

Introduction

Over recent years, a few studies have high-

lighted that acute lymphoblastic leukemia (ALL) is a risk condition for the evolutionary wellbeing of children since it might impair their development at physical, cognitive, behavioral and social level.¹⁻⁷

However, the occurrence of malignant tumors in children/early adolescents (aged 0-14) has been at a steady stage for several years, despite the rise in diagnosis described over the '90s,⁸ and the increasing number of children who survived tumor disease. Nevertheless, in 2008, in Italy cancer was still the major cause of death among children/early adolescents, and ALL was the most prevailing infantile cancer, with a higher incidence than in United States and North Europe. Every year, in Italy, 5 children among 100.000 suffer from leukemia, and 3 cases out of 4 are diagnosed as ALL.⁹ Suffering from tumors such as ALL and undergoing heavy necessary treatments turn out to be a very distressing and traumatic experience for children.³ Invasive and long-lasting treatments cause physical pain and psychological suffering that alter children's daily life and the relationship with their body, as well as the self- and the others' image, and the connection between internal perception and external world.^{2,10-13}

The marked change of children's everyday life requires an effort of adjustment, which is often really challenging,¹⁴ since the diagnosis, the hospitalization, the long-lasting treatment, and the frequent check-ups, as well as the way children value such stressors and what they are experiencing (the cancer and the treatment), may be extremely distressing.¹⁵

Children's anxiety coupled with parents' stress can make the whole family live a surrealistic experience. As a consequence, parents tend to consider the time and space of their own life exactly as if they were time and space of their children's, causing an alteration of their own skills of coping critical events and transforming the whole family's lifestyle as well.^{3,4} The study is consistent with the latest literature of the field, that has focused on the complexity of the psychosocial adjustment of children with cancer and their respective parents, over the history of the disease,^{5,16-18} identifying, especially during the treatment phase, children's tendency to use repressive coping strategies.^{7,19-21} It is noteworthy that this research project deals with some innovative and supplementary aspects that derive from the authors' interventions with children and families during the strenuous treatment phase. Firstly, the attribution of relevance to children's *locus* of control,²² as a possible further internal resource for adjustment, as well as the interest in the likely relationship between such psychological characteristic and the coping strategies mostly used to face the difficulties during the treatment phase. Therefore, due to the difficulty of the adjust-

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ment process, as recognized by most studies of the field,²³⁻²⁵ it seems to be crucial to extend the research of specific children's psychological aptitudes that may be coping resources for the experienced risk condition. Equally crucial, it appears addressing the attention to caregivers' psychological functioning characteristics as likely children's external resource that can be useful for their psychosocial adjustment, and for preventing them from an evolutionary black-out process.

From this point of view, the interest in the possible relationship between children's and maternal coping strategies – since mothers play a primary role as caregivers who accompany children over the whole history of disease – should be considered as an additional fresh

contribution of the study. The interest lies on the idea that, on their taking care of their respective children during almost all demanding stages of disease, mothers exhibit them behavioral models to face the difficulties that may influence the children's coping style.

Materials and Methods

On account of what said, the study focuses on coping efforts and *locus* of control. The interpreting model adopted read coping efforts in terms of style, cognitive, emotional and behavioral strategies useful for managing stressful occurrences. More specifically, it deals with the strategies effective to handle the history of disease that children suffering from leukemia, coupled with their respective mothers, activate within complex contexts and relationships during different phases of the natural progression of disease. The model considers the dichotomous coping styles, the pair of monitoring and blunting approaches,²⁶ paying attention and being sensitive to every aspect of disease characterize the monitoring style, while distraction and cognitive avoidance of stressors delineate the blunting approach. The theoretic operational model adopted considers internal and external *locus* of control.²² Children may react either actively in order to control and face disease, or they have a passive response because they perceiving themselves as powerless against it. If children think that events occur because their own behavior provokes and control them, they will have internal *locus* of control; on the contrary, when they consider external environment, fate or the other's people control as the primary cause of events – which therefore they cannot control – they will have external *locus* of control. Based on the dichotomous coping approaches and the two kinds of *locus* of control as likely resources useful for the process of adjustment to disease during its natural progression, the study starts from some specific

hypotheses. As for coping strategies, it hypothesizes that since children involved, with their respective mothers, have started the treatment phase – they are far off the challenging stress caused by the diagnosis and, therefore, they would mainly use monitoring coping strategies. The study also assumes the presence of a significant connection – in terms of modeling – between children's and mothers' coping strategies. Mothers who tend to mainly use active and adaptive coping strategies are coupled with children who choose monitoring strategies to face difficulties, as well as, mothers who adopt blunting coping strategies are connected to children who use escape coping. With regard to the relevance given by the study to *locus* of control, as mentioned in the introduction, it is hypothesized a connection between the coping styles mainly used by children to handle critical events, and their own attribution of sense and meaning to what happened (*locus* of control).

Such hypotheses considered, the goals of the study are: i) verify whether coping strategies of children with Leukemia are monitoring type; ii) verify the presence of a significant connection and its nature between coping strategies and the distinct causal attributions to critical events (LOC) made by children during the treatment phase; iii) verify the presence of a significant connection and its nature between the coping strategies activated by both children and mothers during the treatment phase.

Participants

The study involved one experimental group, which consisted of 40 children (15 males and 25 females) suffering from ALL (M=10.8; SD=2.5) who underwent the treatment phase two months past the diagnosis, and their respective mothers (M=41.7; SD=6.3) (Table 1); one control group, consisted of 30 healthy children (11 females and 19 males) (M=10.4; SD=2), who were collected from a school in

Palermo. The two groups were symmetrical with regards to age, gender (percentage of males and females), families' socioeconomic status (defined according to parents' education), and nationality (Italian) (Table 1).

Since the study is a multicentric preliminary investigation, the experimental group recruitment involved two national centers of excellence of pediatric oncology that have had a research-based relationship for some years. Twenty-five children were recruited from the *Hospital Unit of Pediatric Onco-hematology of A.R.N.A.S. Civico-Di Cristina-Benfratelli* of Palermo, while 15 children were selected from the *Hospital Unit of Pediatric Hematology San Gerardo* of Monza. The recruitment was carried out according to the following inclusion criteria: i) diagnosis of ALL; ii) time past from the diagnosis: about two months; iii) lack of severe neurologic sequelae and genetic syndromes; iv) children aged 8-13.

Even if the number of the participants was limited because of the recruitment criteria, it represented almost the entire universe of children with ALL who were hospitalized in Palermo and Monza at the time of the research (January-November 2013). The investigation was performed after the approval of Ethical Committee II of Palermo, and after acquiring the informed consent signed by both mothers and children. To be more precise, after the parents' approval, the researcher read and explained the children the form, which they were called on to sign, containing information about the study, the tools to be administered, and especially the advantages of participating. They were called on to participate in a path that would have enabled them to find out personal resources, powerful forces – e.g. the favorite way they were used to facing difficulties or self-explaining the events – as well as to be involved in guided activities of strengthening and support their likely weaknesses.

Table 1. Characteristics of experimental group (40 children and their mothers) and control group (30 children).

Variables	Children experimental group	Children control group	Mothers experimental group
Age, mean±SD	10.8±2.5*	10.4±2*	41.7±6.3
Time since diagnosis (days), mean±SD	50.8±12.4	-	-
Others diseases (allergies), yes/no	7/33	2/28	-
Gender			
Male	15 (37.5%)	11 (37%)	0
Female	25 (62.5%)	19 (63%)	40 (100%)
Title of study	-	-	
Lower secondary education			30%
High school			50%
Degree			20%
Marital status, married	-	-	40 (100%)
Household income	-	-	1

*Children: range 8-13 years.

Tools and procedures

The research project administered the following investigation tools.

The *Monitor-Blunter Style Scale (MBSS)* was used to assess the coping strategies of the mothers of the children involved in the research project.²⁷ It is a self-report situational anxiety questionnaire that presents four situations almost uncontrollable and distressing referring to near-real-life contexts such as a doctor's office, work environment, etc. Each situation has eight likely responses that the mother is asked to choose. The different coping styles are distinct in two halves: active behaviors such as, for example, *asking for information* (monitoring coping), and passive behaviors related to the choice of avoiding a situation perceived as adverse (blunting coping). The *Child Behavioral Style Scale (CBSS)* was used to evaluate children's coping strategies.²⁰ It is the mirror version of MBSS where the uncontrollable and distressing situations regard children's contextual everyday life – for example at home, at school, at a dental office, etc. The difference from the version addressed to adults is that for each of the eight behaviors relating to a distressing situation, the children are called on to ask with a dichotomous YES/NO type response. As for the psychometrical properties, the tool has a good internal consistency. Dimensions referring to the blunting style are negatively correlated with the monitoring dimensions ($r=-0.41$, $P<0.01$; $r=-0.49$, $P<0.01$). The test-retest shows that the subscales of the test are long-lasting stable ($r=0.72$, $P<0.01$; $r=0.75$, $P<0.01$).

The *Locus of Control Scale for Children* was used to investigate the children's perception of controlling the events.²⁸ It is a self-assessment scale consisted of 40 items, whose one half is related to internal cause attribution, while the other half to external attributions with a dichotomous model response YES/NO type. The items describe strengthening situations

like foster caring, reaching goals, and becoming self-confident. As for the psychometrical properties the tool has a good internal consistency, which was measured through the split-half method ($r=0.63$; $r=0.68$; $r=0.74$).

With regards to the administration procedure of the tools, the children and mothers are individually met at the Day Hospital or the hospital unit, after having first met a psychology of the pediatric oncology operational units, who explain each of them the meaning of the study, and give them the forms for the informed consent. The administration of the tools is performed in one meeting, followed by another one scheduled to talk about the inputs given by the tools.

Analysis of data

The collected data have been codified according to the procedures relevant to the tools used, and analyzed via descriptive and parametrical analysis, through the statistic software for Social Sciences SPSS (19.0 for Windows). The data were previously tested to verify the possible application of parametrical tests. The Kolmogorov-Smirnov's test has been used to verify the normality of the distribution of the coping strategies scores and the *locus* of control scores ($P>0.05$), and the Levene's test has been used to verify the homogeneity of the variances between the groups ($P>0.05$).

Pearson's r coefficient of correlation has been calculated, for the experimental group, to verify likely statistically significant correlations between the children's coping strategies and *locus* of control, and children's and maternal coping strategies.

Furthermore, t-test has been used to compare the children's mean scores obtained from each coping scale (monitoring/blunting); the children's mean scores obtained from each *locus* of control approach (internal/external); and the mothers' mean scores

obtained from each coping scale (monitoring/blunting). Finally, a multivariate analysis of variance (MANOVA) has been calculated by continuous variables – *i.e.* the scores obtained from the tools used – in order to verify the effect of the independent variable, which consisted of health condition of the children of the two groups (healthy children and with ALL) on the dependent variables, such as coping style and *locus* of control. Hence, MANOVA has been used to investigate likely differences between the experimental and control groups with regard to the use of monitoring and blunting coping, and internal and external *locus* of control.

Results

The data concerning the coping strategies of children with Leukemia (experimental group), which were obtained from the CBSS, and of their respective mothers', which were obtained from the MBSS, show that both mothers and children resorted to monitoring coping strategies with a statistically significant rate of occurrence (children: $M=17.8$, $SD=3.8$; mothers: $M=10.48$, $SD=3.4$), rather than to blunting coping strategies (children: $M=14.1$, $SD=3.7$; mothers: $M=5.2$, $SD=3.5$) (as for children: $t=3.09$; $df=39$; $P=0.004$; as for mothers: $t=9.9$; $df=39$; $P=0.001$) (Tables 2 and 3). Hence, the adopted coping strategies result to mainly be of active response type rather than of avoidance and/or delegating type. The data from *locus* of Control Scale for Children concerning the modality of causal attribution to events highlight the children's tendency towards internal causes ($M=53.1$, $SD=4.7$), which is shown by the statistically significant difference between their internal and external *locus* of control ($t=11.7$; $df=39$; $P=0.001$) (Tables 2 and 3).

The results gained from the control group

Table 2. Descriptive statistics and multivariate analysis of variance (MANOVA): experimental group (40 children and their mothers) and control group (30 children).

Variables	Children experimental group, mean (SD)	Children control group, mean (SD)	Mothers experimental group, mean (SD)	MANOVA
Coping monitoring	17.8 (3.8)	18.9 (3.5)	10. (3.4)	$F_{(2,69)}=1.62$ sign.>0.05 $\eta^2=0.023$
Coping blunting	14.1 (3.7)	13 (3.5)	5.2 (3.5)	$F_{(2,69)}=1.52$ sign.>0.05 $\eta^2=0.022$
Internal <i>locus</i> of control	53.2 (4.7)	56.2 (6)	-	$F_{(2,69)}=5.53$ sign.<0.05 $\eta^2=0.07$
External <i>locus</i> of control	39 (9.5)	42.5 (8.2)	-	$F_{(2,69)}=2.61$ sign.>0.05 $\eta^2=0.037$

are almost equivalent. It appears that the healthy children also resorted mainly to monitoring coping strategies ($M=18.9$, $SD=3.49$) (Table 2). Moreover, the analysis of the variance has revealed a lack of statistically significant differences between the two groups of children with regard to both monitoring [$F(2,69)=1.62$, $P>0.05$, $\eta^2=0.023$] and blunting coping style [$F(2,69)=1.52$, $P>0.05$, $\eta^2=0.022$]. As for the *locus* of control, the children of the control group display a prevailing internal causal attribution ($M=56.2$, $SD=6$). However, the analysis of the variance highlights a significant difference between the two groups in relation to the internal *locus* of control [$F(2,69)=5.53$, $P<0.05$, $\eta^2=0.07$] that shows a higher score from the control group (Table 2).

Finally, the results concerning the likely correlations between the two variables analyzed in the experimental group, coping and *locus* of control, show the presence of statistically significant positive correlations between monitoring coping strategies and external *locus* of control ($r=0.400$; $P<0.05$) (Table 4). On the contrary, statistically significant correlations are not revealed between monitoring and blunting coping strategies activated by the children and their mothers (Table 5).

Discussion and Conclusions

The results show some striking aspects of the treatment-related psychological functioning of the children with ALL and their respective mothers, not only as content but rather as novelties compared to the scientific literature of the field. They underline distinct resources in facing the tumor. It seems that, despite the difficulties and painful experiences brought by both the severity of the disease and its treatment, children tend to react adopting active and combative behavior instead of an avoiding, delegating or negating conduct. Hence, contrary to most literature of the field, that highlights a repressive coping style in children with tumor, especially during the treatment phase,^{7,20} this study reveals modalities of facing critical events that have proved to be evolutionary resources vital for a good adjustment process.^{3,29}

It is noteworthy that the results of the variance analysis show no statistically significant difference between the coping strategies used by the experimental group and those adopted by the control group. The tendency towards monitoring coping strategies is evident in both cases. The absence of significant differences show that, whether children are suffering from a disease or not, the cognitive, emotional and social aptitudes peculiar to this phase of child evolutionary development, makes children

reacting actively, and supports them in feeling powerful at having control. The predominance of the monitoring coping style, as an evolutionary resource, appears to be more interesting when speaking of the atypical development of children suffering from ALL, and considering the management of the situational complexity.³⁰

Adopting monitoring coping strategies, rather than blunting, is ascribable to the children's ability to maintain positive, hopeful and recovery-trusting thoughts despite the awareness of physical and psychological implications brought by the chemotherapy treatment. Furthermore, the peculiarities of the monitoring coping strategies, such as addressing attention to the specific problems and context, coupled with seeking out information about what happened, may allow children to research resources, inside and outside their self, which may be advantageous means to go through the risk condition. The monitoring coping style, then, seems to be a cognitive, emotional, and relational capital to handle the disease at best. As it implies good levels of awareness and acknowledgement of the events brought by the treatment phase, and it supports the compliance, it allows the conversion of the condition of a non-normative evolutionary crisis into a real evolutionary challenge suited to development.³¹

Equally, the mothers of the children with

ALL involved in the study displayed the tendency to adopt this coping style as well. Besides being a further resource favorable to the therapeutic alliance with medical team,³² the maternal monitoring approach is also advantageous to children who have at their side caregivers who never make them feeling lonely, or terrified by the difficulties arisen. However, the lack of significant correlations between the children's coping strategies and their respective mothers' does not allow to affirm the presence of a connection at the level of modeling, so mothers' coping style presumably has not great influence in shaping their children's ones. Therefore, in consonance with what suggested by a few model of interpreting the process of adjustment to neoplastic disease, it is possible to hypothesize a multi-directional factors that can affect the coping style of children with ALL during the treatment phase.^{14,33} The natural predisposition of children and/or cognitive skills could be one among these. The age range analyzed (10-13 years) implies the predominance of cognitive characteristics, such as the logical reasoning and the systematic approach to problem solving that can foster a coping style focused on problem, on seeking out information, and on attempting to activate the proper behaviors to manage difficulties. The children's own perception of the support given by their parents, by their own friends, and the hospital medical team might

Table 3. Paired samples test (experimental group's children and their mothers).

	Mean	SD	t	df	Sig
Pair 1					
Children: monitoring-blunting	3.7	7.5	3.09	39	0.004
Pair 2					
Children: internal <i>locus</i> -external <i>locus</i>	13.92	7.4	11.7	39	0.001
Pair 3					
Mothers: monitoring-blunting	5.3	3.3	9.9	39	0.001

Table 4. Experimental group: correlations between children's coping strategies and their locus of control (Pearson correlation Coefficient).

Variables	Coping monitoring	Coping blunting
Internal locus of control	0.121	-0.137
External locus of control	0.400*	-0.394*

* $P<0.05$

Table 5. Experimental group: correlations between children's coping strategies and their mother's coping strategies (Pearson correlation Coefficient).

Mothers	Children	
	Coping monitoring	Coping blunting
Coping monitoring	0.238	-0.254
Coping blunting	-0.048	0.051

$P<0.01$; $P<0.05$

be another affecting factor. That is the reason why, in the pediatric oncology units involved in the research, there is a team of professionals aimed at providing psychological support to the children and their families. It should also be considered that, according to the literature of the field, as these children undergo the treatment, their adjustment gradually changes over the history of the disease. The high post-diagnosis distress seems to progressively decrease, as if a new-born situational routine would allow the children to think about future rather than about the current suffering.^{23,34} Actually, no coping strategy is only adaptive or non adaptive, since some coping behaviors can be more or less useful depending on at what step of the disease the children are. Escaping or negating behaviors may be advantageous at bearing the pain provoked by the disclosure of the diagnosis, while, on the contrary, they would be non adaptive when adopted especially during the treatment phase, which requires great efforts. Another factor that could affect the coping style of children with ALL, is the representation they have of the critical events occurring in their own life, and of their relations with them. This representation influences the *locus* of control.²² The interesting point is that the children involved in the study, besides having a high level of monitoring coping style, mainly resorted to the internal *locus* of control. It seems that the children would tend to face the treatment-related difficulties with sense of responsibility, reckoning themselves as powerful at fostering or not the success of the outcome of the therapeutic path. It should be noted, however, that even though the group of control displayed the predominance of internal *locus* of control, the scores obtained by the experimental group are lower. This result can be interpreted in terms of resource advantageous to children with ALL, since an excessive internalization of the *locus* of control could enhance their sense of guilt and responsibility, which are unhelpful to go through the risk condition.

The correlational data between coping style and *locus* of control of the children with ALL appear to be interesting since they highlight a significant correlation, which is positive only between the monitoring coping style and the external *locus* of control. They suggest a thorough examination by increasing the size of the sample. It seems that the externals would tend to face critical events by adopting as active coping strategies as the internals'. Hence, even the children who feel less powerful at controlling the outcomes of events, displayed to be used to resorting to the monitoring coping style, their behavior is active, and they seek out clear information before undergoing the treatment.

Both the children and their mothers showed the tendency to actively cooperate with the

medical team, who is required to provide clear information about the characteristics and the probable implications of conventional and non conventional therapies.³⁵ The acquired information can guide, control and support them in finding the proper adaptive behaviors, which would be the concept field of reference for the cognitive coping that this study reckons as a field of the utmost importance for the facing strategies. Therefore, the clarity of communication about the value of the treatment, and the adequacy of information provided about both the cancer treatment and the specific therapeutic course planned for the children, may avoid the risk that they would refuse to comply the recommended election treatment, or not cooperate with the medical staff, or stop the treatment and end the relationships with the doctors.

The considerations about the outcomes underline that the active involvement of the children and their parents during the treatment phase would minimize the sense of passivity, and the perception of incapability that often occur together with the emotional heaviness of such a phase.³⁶⁻³⁸

Lastly, the results suggest carrying on the study with an increase of the size of the sample, and new measurements of the likely correlations between the children's coping strategies and further variables relating to the *locus* of control such as the temperament, distinct cognitive skills, etc.

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