

In Review

What Is Resilience?

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Objective: While everyone—including front-line clinicians—should strive to prevent the maltreatment and other severe stresses experienced by many children and adults in everyday life, psychiatrists and other health professionals also need to consider how best to support, throughout the lifespan, those people affected by severe adversity. The first step in achieving this is a clear understanding of the definitions and concepts in the rapidly growing study of resilience. Our paper reviews the definitions of resilience and the range of factors understood as contributing to it, and considers some of the implications for clinical care and public health.

Method: This narrative review took a major Canadian report published in 2006 as its starting point. The databases, MEDLINE and PsycINFO, were searched for new relevant citations from 2006 up to July 2010 to identify key papers considering the definitions of resilience and related concepts.

Results: Definitions have evolved over time but fundamentally resilience is understood as referring to positive adaptation, or the ability to maintain or regain mental health, despite experiencing adversity. The personal, biological, and environmental or systemic sources of resilience and their interaction are considered. An interactive model of resilience illustrates the factors that enhance or reduce homeostasis or resilience.

Conclusions: The 2 key concepts for clinical and public health work are: the dynamic nature of resilience throughout the lifespan; and the interaction of resilience in different ways with major domains of life function, including intimate relationships and attachments.

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Clinical Implications

- Effective clinical care and public health work to develop resilience require partnerships across health and nonhealth sectors.
- Psychiatrists and other mental health professionals should collaborate with policy-makers in developing policies and interventions to bolster resilience.
- Clinical and public health interventions each have a role in improving the chances of resilience among children and adults affected by severe adversity. Interventions across the lifespan include support for parents of infants, early childhood intervention programs, school-based interventions, workplace and unemployment programs, and activity programs for older adults.
- Clinical implications include renewed emphasis on the value of a clinician taking a good history, a strong therapeutic alliance, and the reinforcement of attitudes and behaviours known to facilitate resilient outcomes.

Limitations

- There is a lack of consensus regarding an operational definition of resilience, although investigators have recently commented that the limitation is less significant than it appears, as most definitions use similar domains as evidence of resilience.
- The clinical relevance is not so far established for measures of resilience, though their experimental use will likely assist rapid growth in understanding the effectiveness of protective interventions.
- Given the multidisciplinary study of resilience, a literature search based on MEDLINE and PsycINFO may restrict the findings although it is likely to give access to major ideas.

Key Words: *resilience, mental health, gene–environment interaction, public health*

The multidisciplinary study of resilience is expanding rapidly. Our paper reviews the definitions of resilience and the factors contributing to it, and considers the implications for clinical care and public health. A major report¹ noted recently that the study of resilience began with the study of maltreated children. In this population above all, everyone responsible, including frontline clinicians, should strive to prevent maltreatment, including physical, sexual, and emotional abuse, neglect, and exposure to intimate partner violence. Incumbent on people working in psychiatry and other health professions is also the need to support, throughout the lifespan, those people affected by maltreatment and other serious forms of adversity.

There is widespread uncertainty and confusion about the nature and effects of stress in childhood or at any life stage.² For example, mastery of relatively minor adversity by children is important for developing resilience to later challenges. However, the public and professions are less aware that levels of stress associated with excessive, persistent or uncontrollable adversity, without the protection of stable adult support are associated with disruptive effects on brain function (and multiple organ systems) that can lead to lifelong disease and behavioural problems.² Overall insufficient attention is paid to health promotion and disease prevention strategies for vulnerable young children and their parents, or older and marginalized groups, that focus either on reducing significant stressors affecting everyday life or, pertinent to our article, ameliorating the effects of these stressors.^{2,3}

Early experiences can affect adult health in 2 ways,² either by cumulative effects over time or by the biological embedding of adversities or advantages during sensitive developmental periods. Differences in health outcomes related to social class and other markers of disadvantage are well documented across a broad range of cultures and in countries with various health care systems. The major US study of ACEs demonstrated a graded relation between the number of ACEs and both lifetime and recent depressive disorders. These results suggest that exposure to ACEs, generally greater in people at relative social disadvantage,⁴ is associated with increased risk of depressive disorders up to decades later. Prevention of maltreatment, early recognition of childhood abuse, and appropriate intervention may thus play an important role in the prevention of depressive disorders throughout the lifespan. These studies also show

individual differences in the magnitude of effects. While 60% of people reporting significant emotional abuse in childhood developed major depression as adults (compared with 19% of those reporting no emotional abuse), the remaining 40% of emotionally abused people did not.⁵ Similar associations are found in a wide array of health conditions, including cardiovascular disease. Such marked heterogeneity in the long-term consequences of early life experiences indicates the role of differences in vulnerability and resilience in moderating these associations.² It is becoming apparent that the vulnerability or resilience of any child as well as any person across the lifespan can be determined by a complex interplay of individual attributes and the social context—and the nature of adverse events including their number, intensity, and persistence.

The authors undertook a narrative review of the definitions of resilience that took a major Canadian report from 2006 as its starting point.¹ The databases, MEDLINE and PsycINFO, were searched for relevant citations from 2006 up to July 2010 to identify key papers considering the definitions of resilience and related concepts.

Definitions of Resilience

Fundamentally, resilience refers to positive adaptation, or the ability to maintain or regain mental health, despite experiencing adversity.¹ Definitions have evolved as scientific knowledge has increased. Resilience is studied by researchers from diverse disciplines, including psychology, psychiatry, sociology, and more recently, biological disciplines, including genetics, epigenetics, endocrinology, and neuroscience. However, no consensus on an operational definition exists. The central question is how some girls, boys, women, and men withstand adversity without developing negative physical or mental health outcomes.

The first differences in definitions centre on conceptualizing resilience as a personal trait, compared with a dynamic process. A narrow definition considers resilience as a personal trait operating after a single short-lived trauma.^{6,7} Early research on resilience focused on the selective strengths or assets, such as intellectual functioning that helped people survive adversity. Pioneering research focused on childhood adversities. Over time the types of adversity were broadened to include negative life events across the lifespan statistically associated with adjustment difficulties or subsequent mental disorders. These events included deficient parenting, poverty, homelessness, traumatic events, natural disasters, violence, war, and physical illness.

Subsequent researchers focused on the contribution of systems (families, services, groups, and communities) to assist people in coping with adversity. Accordingly, the definition of resilience and resilience interventions expanded to become “protective and vulnerability forces at multiple levels of influence—culture, community, family and the individual.”^{8, p 151} Other investigators defined resilience yet more broadly as “the protective factors

Abbreviations

ACE	adverse childhood experience
EEG	electroencephalogram
HPA	hypothalamic–pituitary–adrenal
MAOA	monoamine oxidase A
PTSD	posttraumatic stress disorder

and processes or mechanisms that contribute to a good outcome, despite experiences with stressors shown to carry significant risk for developing psychopathology^{9, p 94} or “an interactive concept that refers to relative resistance to environmental risks or overcoming stress or adversity”^{10, p 1} or “a dynamic process of positive adaptation in the context of significant adversity”^{11, p 858} or a “multi-dimensional characteristic that varies with context, time, age, gender and cultural origin, as well as within an individual subject to different life circumstances.”^{12, p 76} These definitions together acknowledge 2 points: various factors and systems contribute as an interactive dynamic process that increases resilience relative to adversity; and resilience may be context and time specific and may not be present across all life domains. Accordingly there are multiple sources and pathways to resilience, which often interact, including biological, psychological, and dispositional attributes, and social support and other attributes of social systems (family, school, friends, and community).^{11,13,14} Despite the lack of consensus on an operational definition of resilience, most definitions use similar domains as evidence of resilience.¹⁵

Sources of Resilience

Personal Factors

Personality traits (openness, extraversion, and agreeableness), internal locus of control, mastery, self-efficacy, self-esteem, cognitive appraisal (positive interpretation of events and cohesive integration of adversity into self-narrative), and optimism all evidently contribute to resilience. The findings of pioneering investigators indicate that intellectual functioning, cognitive flexibility, social attachment, positive self-concepts, emotional regulation, positive emotions, spirituality, active coping, hardiness, optimism, hope, resourcefulness, and adaptability are associated with resilience.¹⁶ Demographic factors (age, sex, gender, race, and ethnicity), social relationships, and population characteristics relate variably with resilience, depending on study methods and resilience definition. Some factors that increase resilience may be life stage-specific and others may operate across the lifespan.

Biological Factors

Findings from a recent explosion of research in biological and genetic factors in resilience¹⁷ indicate that harsh early environments can affect developing brain structure, function and neurobiological systems.¹⁸ Changes may occur in brain size, neural networks, the sensitivity of receptors, and the synthesis and reuptake of neurotransmitters.¹⁹ These physical changes in the brain can substantially exacerbate or reduce vulnerability to future psychopathology.¹⁸ Brain changes and other biological processes can affect the capacity to moderate negative emotions, and thereby affect resilience to adversities. An EEG study²⁰ in maltreated and nonmaltreated children aged 6 to 12 years found significant interaction in patterns of EEG activity between resilience, maltreatment status, and gender.

Powerful evidence exists that supportive, sensitive early caregivers in infancy and childhood can increase resilience and reduce the effects of so-called toxic environments and that there may be sensitive periods when interventions work best.²¹ An elegant model in rats found that maternal care of rat pups, such as increased licking, reduces the HPA response to stress.²² In humans, oxytocin suppresses the HPA axis and may contribute to positive social interaction by reducing stress and anxiety and thereby increasing interpersonal trust.²³ Exposure to stressful events in childhood and adolescence is consistently shown to produce long-lasting alterations in the HPA axis, which may increase vulnerability to mood and anxiety disorders.²⁴

Studies of healthy people exposed to childhood maltreatment have identified biological variables associated with resilience. In a study²⁵ of adrenal steroid hormones in maltreated and nonmaltreated children, lower morning cortisol was related to higher resilient functioning in nonmaltreated children only. In contrast, high morning cortisol was related to higher resilient functioning in physically abused children. When considered together, personality, cortisol, and dehydroepiandrosterone were independent contributors to resilience.²⁵

A study of survivors of the Rwanda genocide found that more lifetime traumatic events led to a higher prevalence of lifetime PTSD in a dose-response relation. However, this was modulated by the catechol-O-methyltransferase genotype: the valine allele carriers showed a typical dose-response relation but methionine-methionine homozygotes had a high risk of PTSD, independently of traumatic load.²⁶

Environmental-Systemic Factors

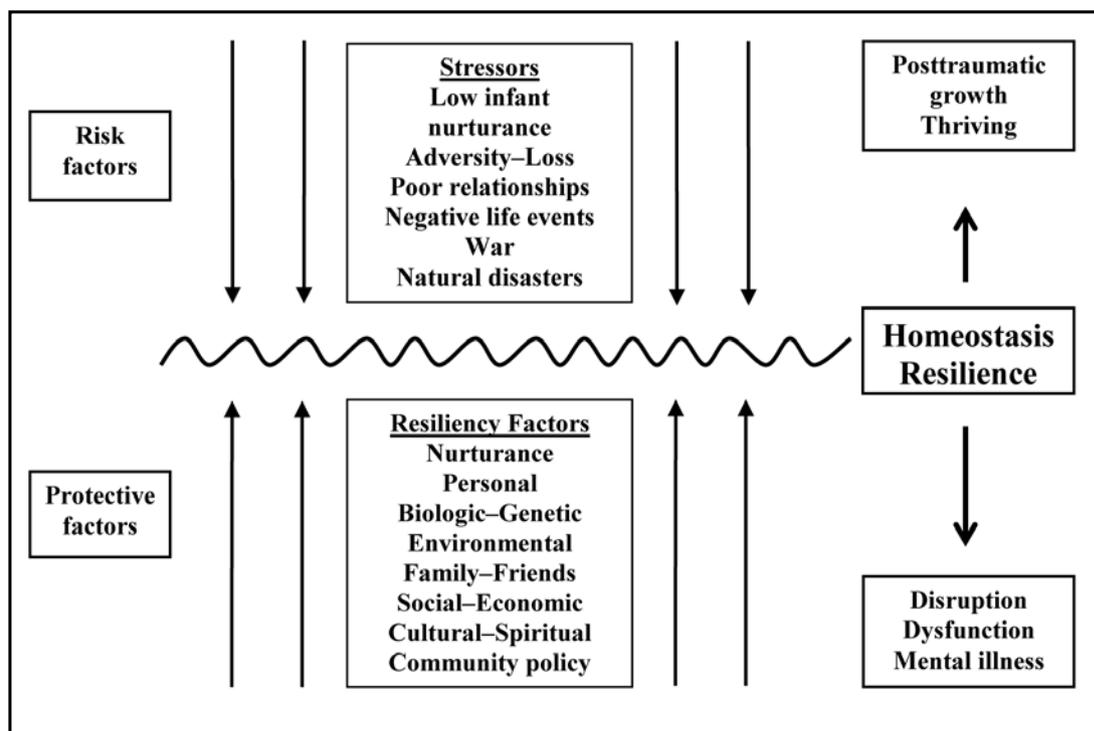
On a microenvironmental level, social support, including relationships with family and peers, is correlated with resilience. Secure attachment to mother, family stability, secure relationship with a nonabusive parent, good parenting skills, and absence of maternal depression or substance abuse are associated with fewer behavioural problems and better psychological well-being in maltreated children. Social support can come from positive peers, supportive teachers, and other adults as well as immediate family.

On a macrosystemic level, community factors, such as good schools, community services, sports and artistic opportunities, cultural factors, spirituality and religion, and lack of exposure to violence, contribute to resilience. Despite these findings, good social policy has been underused to enhance resilience in populations.^{11,27}

Interaction Between Personal, Genetic, and Environmental Factors

Interest is growing in this dynamic interaction and interactive models of resilience.^{14,28,29} One of these models, developed by us illustrates the factors that enhance or reduce homeostasis or resilience (Figure 1).

Figure 1 Factors that enhance or reduce homeostasis or resilience



Genetic studies on resilience offer new insights into the interaction of genes with the environment (Genes \times Environment). The development of mental disorders has been known for some time to be related to genetic predisposition in combination with the person's past and current life experiences and environments. More surprising is evidence that social experiences can lead to substantial and enduring changes in gene expression that can in turn affect later behaviour in a person and be transmitted to the next generation.²⁹

Genetic variations may interact protectively against acute and chronic environmental insults and have a protective function for some maltreated children.^{30,31} For example, polymorphisms of MAOA determine its efficiency in the degradation of dopamine, norepinephrine, and serotonin neurotransmitters.³² Child maltreatment was less strongly associated with antisocial behaviour in males with high MAOA activity than in those with low MAOA activity.³³ A 3-way interaction of a brain-derived neurotrophic factor polymorphism and the promoter region of the human serotonin transporter gene polymorphism, and maltreatment in childhood has been associated with depressive disorder, but the presence of positive social supports ameliorated the genetic and environmental risks for depression.³⁴ In this complex model, 2 genetic factors interact with one environmental factor (maltreatment) to increase depression (Gene \times Gene \times Environment) but another environmental factor (positive social support) can reduce this risk (Gene \times Gene \times Environment \times Environment). Research on the effects of genetic polymorphisms and coping strategies

in high-risk youth offers promising directions for understanding resilience and its promotion.³⁵

Conversely, genetic association studies suggest that polymorphisms of genes that regulate the HPA axis may function in conjunction with exposure to child maltreatment to increase activity of the amygdala–HPA axis resulting in stress-related disorders. These interactions underlie critical periods for emotional learning, which can be modified by developmental support and maternal care as described above.³⁶

Davydov et al³⁷ review studies from neuroscience, behavioural science, and individual, group, and cultural experience. They proposed that resilience arises from a complex interaction of forces at various levels, incorporating the person's genetic heritage, gene–environment reactions, the effect of positive and negative experiences throughout life, the impact of a person's social (group) settings, and the cultural setting. To investigate resilience by such layered interactions, multidisciplinary international investigations are proposed, requiring co-operation across national borders and moving beyond a narrow focus on one cause or a small group of causes.

Indicators of Resilience

In addition to the variations in definition, the measurements used affect assessments of resilience. Studies on children and adolescents focus on competence across stage-salient developmental domains, including behavioural, emotional, and educational functioning. Competence in one domain

does not guarantee competence in another. A focus on only one of these domains limits the measurement of competence; a focus on multiple domains makes assessment more difficult. Clearer information should be provided about what measurements or combinations of measurements are used, so that better comparisons among studies can be made.¹⁵ Given the lack of cross-domain competence, however, it is clear that services to maltreated children and their families should be comprehensive. Researchers must also consider how operational definitions of resilience influence conceptualization of analytic variables and interpretation of findings across populations defined differently, for example, by gender, socioeconomic status, ethnicity, and culture.

Resilient children often have functioning comparable to a control group or the population average in domains such as academic performance, interpersonal relationships, behavioural problems, emotional regulation, and social competence. Indicators can include educational performance, symptoms of depression or anxiety, social skills, substance abuse, and delinquency. In adults, employment, homelessness, substance abuse, and criminality are often included in composite measures of resilience. Measures may include domains theoretically and empirically linked to the studied adversity, not just the population.³⁸

Resilience may be self-identified or reported by observers. Psychologists usually measure resilience using cut-off scores or standard deviations on standardized psychopathological measurement tools for depression, anxiety, and PTSD.³⁶ More recently, researchers have developed specific scales to measure resilience, such as the Connor-Davidson Resilience Scale³⁹ or the Resilience Scale for Adults.¹³

Methodologic Considerations

Some studies do not use standardized measures, or they fail to define the intensity or duration of the adversity. Other studies are small and conducted in specific population groups, which may limit their generalizability. Some studies rely on retrospective self-reports. Qualitative studies of resilience are helpful in generating hypotheses, understanding the meaning of subjects' experiences, illuminating the complex interactions of their social locations (for example, gender, racialization, and socioeconomic status), and explaining quantitative findings, but their generalizability to other groups outside the population studied is often limited.

Cross-sectional design studies cannot identify causation, as the exposure and outcome measures are captured at the same time. Many factors associated with higher resilience may be multiplicative or cumulative. For example, having a nurturing, warm mother may lead to more self-esteem, self-confidence, and social interactions, all of which enhance resilience. Whether many of these factors directly cause resilience or attenuate the effects of risk factors needs to be established. Other uncertainties include the interrelations

of the identified factors (redundant, accumulative, or synergistic) and whether their effects depend on context (magnified or diminished, depending on population, adversity, or time).

Four Related Concepts

Hardiness is a dispositional characteristic that includes a sense of control over one's life, a commitment to ascribing meaning to one's existence, and viewing change as a challenge.⁴⁰ Benefit finding is the ability to make sense of adversity by focusing on the positive changes or personal growth.⁴¹ Thriving occurs when the person not only returns to a prestress level of functioning but also attains an even higher level of functioning with the acquisition of new skills, knowledge, confidence, or improved social relationships.⁴² Posttraumatic growth is a stage beyond thriving and resilience. It is a construct with multiple dimensions, including an increased appreciation of life, closer intimate relationships, a greater sense of personal strength, finding new opportunities, and increased spiritual development.⁴³ Each of the 4 concepts is defined differently by various authors, and the relation to resilience requires further research for better understanding. The first 3 may occur in the context of normal life stressors.

Discussion

We have reviewed how resilience is related intimately to a person's own characteristics and life circumstances, as well as wider factors, including society's concern for human rights to education, participation, safety, and freedom from discrimination. Just as a person's state of health or experience of illness is determined by personal experiences, social circumstances, culture, and political environment in addition to inherited or biological factors,⁴⁴⁻⁴⁶ so it seems that resilience is usefully considered in this way. For people in all parts of the world, socioeconomic inequalities, human rights abuses, and social exclusion have adverse effects on health and mental health,^{4,47-49} and evidently on resilience. From the findings reviewed here, some of the biological, psychological, and social mechanisms likely to underpin the development of personal resilience are becoming apparent.

Resilience is an interactive concept, referring to a relative resistance to environmental risk experiences, or the overcoming of stress or adversity, and it is thus differentiated from positive mental health.¹⁰ However, the factors that influence the development of resilience can be considered as analogous to those that promote mental health. These factors—or determinants—operate on 2 broad levels: each person's life and development; and the sociocultural context (Ezra Susser, 11 July 2010, personal communication), and changes are needed to influence each of these. Accordingly, as in all fields of health, resilience can be promoted through population-based public health measures alongside health system change. The Foresight Project on Mental Capital and Wellbeing from the UK

Government Office for Science⁵⁰ shows that governments have tremendous opportunities to create environments conducive to mental capital (cognitive and emotional resources) and well-being (a dynamic state that refers to a person's ability to develop their potential, work productively and creatively, build strong and positive relationships with others, and contribute to their community), and that failure to act could have severe consequences. The project focuses on childhood development, mental health and well-being at work, and making the most of cognitive resources in older age. Government departments need to work together with each other and with civil society to realize the full benefits. The analogies with resilience are clear.

Examples of population-based interventions across the lifespan that are likely to support resilience include social policies and support for parents of infants, early childhood intervention programs, school-based interventions, workplace and unemployment programs, and activity programs for older adults; all with attention to environment, gender, culture, life cycle, and special vulnerabilities of population groups.⁴⁵ Particularly relevant is the scaling up and evaluation of effective participatory community-based programs to support early child development.⁵¹

The most significant clinical application of the concept is a reminder about the value of the clinician taking a good history and the need for developing a strong therapeutic alliance, the basic elements of a clinical encounter that can receive less attention in the professional era of bio-determinism, and emphasis on models and techniques in therapies.⁵² Based on knowledge of the factors that usually enhance resilience and how the patient has successfully dealt with severe stress in the past, the clinician can reinforce optimal responses to adversity. Michael Rutter's¹⁰ descriptions of the cumulative and interactive effects of life stresses in children and young people, and the turning points that positive events may represent, remain influential in promoting this clinical approach. Five observations are especially relevant to the clinician^{10, p 1}:

1. Resistance to hazards may derive from controlled exposure to risk (rather than its avoidance);
2. Resistance may derive from traits or circumstances that are without major effects in the absence of the relevant environmental hazards;
3. Resistance may derive from physiological or psychological coping processes rather than external risk or protective factors;
4. Delayed recovery may derive from turning point experiences in adult life; and
5. Resilience may be constrained by biological programming or damaging effects of stress and (or) adversity on neural structures.

The clinical relevance is not so far established for measures of resilience, although their experimental use will likely assist rapid growth in understanding the effectiveness of protective interventions.

Conclusions

The 2 key concepts for clinical and public health work are: the dynamic or interactive nature of resilience throughout the lifespan; and the interaction of resilience with major domains of life function, including intimate relationships and attachments. While positive stress is important for healthy development, resilience is more likely to be acquired or present when a child or adult can avoid strong, frequent, or prolonged stress, or when the effects are buffered by supportive relationships. Effective clinical care and public health work to develop resilience requires partnerships across health and nonhealth sectors. Clinical and public health interventions each have a role in improving the chances of resilience among children and adults affected by maltreatment and interpersonal violence and other sources of severe adversity.

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Résumé : Qu'est-ce que la résilience?

Objectif : Même si chacun d'entre nous — y compris les cliniciens de première ligne — devrait tâcher de prévenir les mauvais traitements et autres stress graves que subissent nombre d'enfants et d'adultes dans la vie de tous les jours, les psychiatres et autres professionnels de la santé doivent aussi examiner comment soutenir au mieux, toute leur vie durant, ces personnes affectées par une grave adversité. La première étape pour y arriver est une compréhension nette des définitions et concepts dans les connaissances rapidement croissante de la résilience. Notre article passe en revue les définitions de la résilience et la gamme des facteurs que l'on croit y contribuer, et envisage certaines des implications pour les soins cliniques et la santé publique.

Méthode : Cette revue narrative a pris comme point de départ un important rapport canadien publié en 2006. Des recherches de nouvelles citations pertinentes, de juillet 2006 à juillet 2010, ont été effectuées dans les bases de données MEDLINE et PsycINFO afin de repérer les principaux articles traitant des définitions de la résilience et des concepts connexes.

Résultats : Les définitions ont évolué avec le temps mais fondamentalement, la notion de résilience se rapporte à l'adaptation positive, ou à la capacité de maintenir ou de regagner la santé mentale, malgré l'expérience de l'adversité. Les sources personnelles, biologiques, et environnementales ou systémiques de la résilience et leur interaction sont examinées. Un modèle interactif de résilience illustre les facteurs qui améliorent ou réduisent l'homéostasie ou la résilience.

Conclusions : Les 2 concepts clés pour le travail clinique et de santé publique sont : la nature dynamique de la résilience durant toute la vie; et les interactions de la résilience de manières différentes avec les domaines majeurs de la vie humaine, notamment les relations intimes et l'attachement.