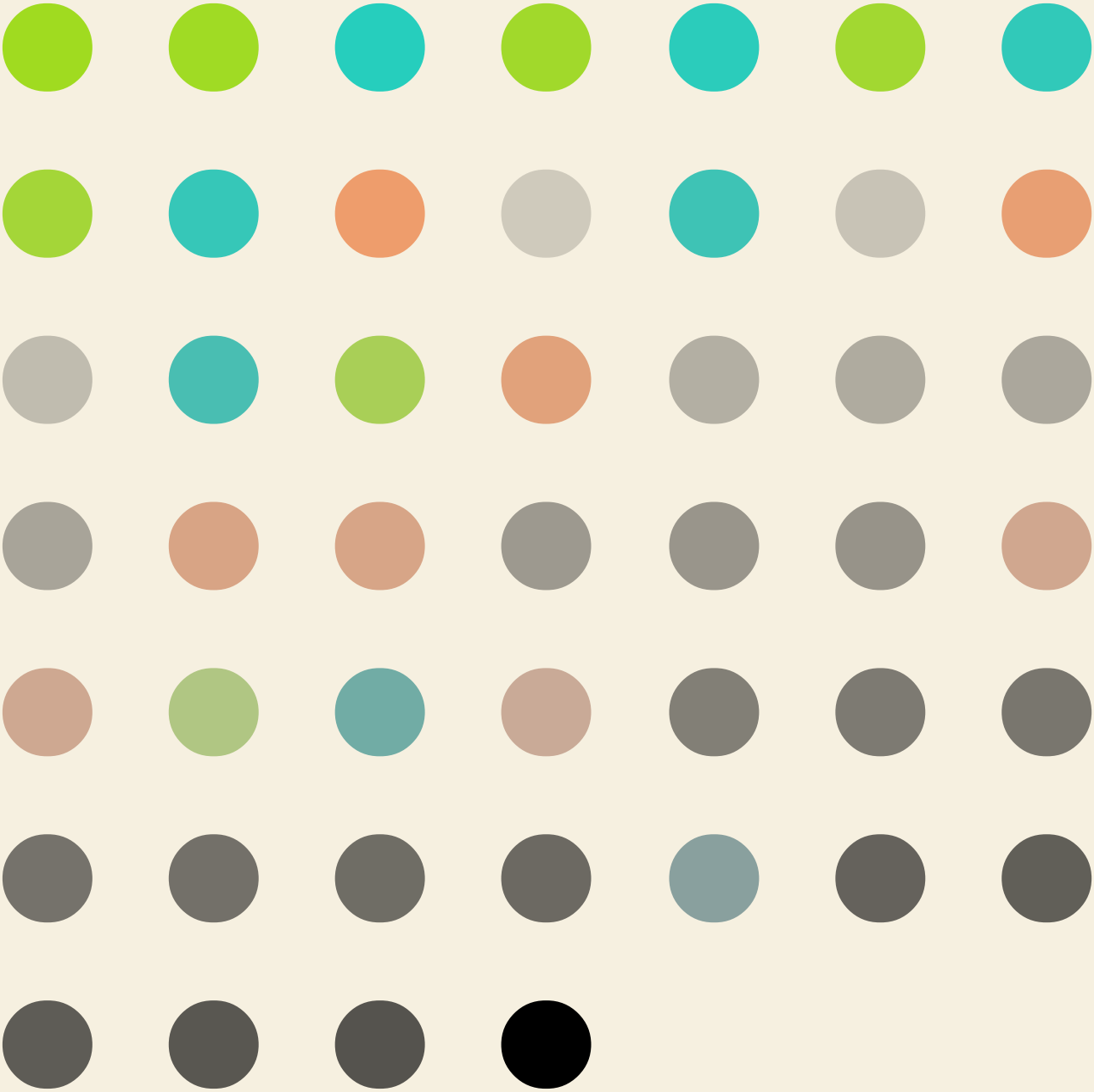

Risk Factors for Suicidal Behavior in Adolescence:

THE ROLE OF SUICIDAL IDEATION

By Ana Ortín Peralta

Directors: Cristiane Duarte, Ph.D., M.P.H.; Regina Miranda, Ph.D.
Tutor: Adolf Tobeña Pallarés

A dissertation submitted in fulfillment of the requirements
for the Degree of Doctor of Psychiatry.

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Barcelona, 2015

RISK FACTORS FOR SUICIDAL BEHAVIOR IN ADOLESCENCE: THE ROLE OF SUICIDAL IDEATION

DEPARTAMENT DE PSIQUIATRIA I MEDICINA LEGAL
UNIVERSITAT AUTONOMA DE BARCELONA

We hereby certify that we have read this dissertation prepared by Ms. Ana Ortin Peralta under our direction and we recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Psychiatry.

New York, March 19, 2015

_____
Cristiane Duarte, Ph.D., M.P.H.
Associate Professor
New York State Psychiatric Institute/Columbia University Medical Center

_____
Regina Miranda, Ph.D.
Associate Professor
Hunter College and The Graduate Center, City University of New York
Columbia University Medical Center

_____
Ana Ortín Peralta, M.S.
Ph.D. Candidate
Universistat Autonoma de Barcelona
New York State Psychiatric Institute/Columbia University Medical Center

Tutor: Dr. Adolf Tobeña Pallarés

A los hilos de la alfombra
que me impiden caer:
mi familia y mis amigos

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No sé por donde empezar… esta tesis ha vivido conmigo momentos muy intensos, durante el tiempo que llevo viviendo en Nueva York. La idea nació aquí, cuando llegué, y conmigo ha permanecido durante todo este tiempo, atravesando 5 años de intensos cambios personales y profesionales a un ritmo vertiginoso, que me llevaron a no cuidar el suelo en que pisaba, y mi alfombra se quedó casi sin hilos. Por suerte la alfombra tenia buen base, hilos tejidos durante toda mi vida que me impidieron caer, que se hicieron fuertes, intentando cubrir todo el espacio que quedaba libre y ayudándome a tejer hilos nuevos, no improvisados, no al azar, no pasajeros, sino cuidados y consistentes para que no se pudieran volver a romper. Es a esos hilos, antiguos y nuevos, a quienes quiero dedicar esta tesis.

Primero, mis padres, que forman filas siempre que lo he necesitado, que nunca, nunca han dudado de mí, aunque se lo pusiera bien difícil de pequeña. Pero se encabezonaron en que valía y en que podría, y ese mensaje siempre lo he llevado conmigo, *yo puedo y mi familia cree que puedo*, ¿qué más se puede pedir para por lo menos no intentarlo? Una y otra vez…una y otra vez… A mi hermana, que teje redes invisibles, silenciosas, expectantes, y que cuando creía que no había fondo, aparecían y me sujetaban. Porque ella siempre está ahí, observando, esperando a que pise mal para ayudarme a levantar de nuevo.

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todos lo colores que tenía dentro. Y ya van 30 años de esto, 30 años de pintar juntas cuadros de recuerdos inolvidables y jugar a reinventarnos a nosotros mismas una y otra vez.

A los hilos que se han subido a mi alfombra y que no se han querido bajar. Si Beita si, tú eres uno de ellos. ¡No os bajéis nunca!

A los nuevos hilos, Munia, María, Mariangi, Olga, Cristina, Andrea, y superhéroes varios, que me encontraron cabizbaja arrastrando una alfombra pelada y, aguja e hilo en mano y sin apenas conocerme, han hecho el increíble esfuerzo de tejer nuevos hilos conmigo y darle nueva vida mi alfombra. Viviendo fuera y sin poder sujetarme de los de siempre, ellos han sido sin lugar a dudas lo mejor que me ha pasado en esta cuidad.

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A las directoras de la tesis, Cristiane y Regina, que me han acompañado pacientemente durante estos años, me han visto abandonar y retomar la tesis infinidad de veces, pero siempre han encontrado la forma de ayudarme a darle una vuelta más y retomarla con más fuerza, animándome non-stop… “finish the disserattion’, “finish the dissertation”… A ellas, que han esprintado conmigo en la recta final como las grandes profesionales que son, y, sin lugar a dudas, dos modelos a seguir a todos los niveles.

A la tesis en si misma, que al final ha resultado ser una buena terapia.

Background of Directors and Tutor of the Dissertation

Director: Cristiane S. Duarte, Ph.D., M.P.H.

Dr. Duarte is Associate Professor of Clinical Psychology in the Division of Child and Adolescent Psychiatry, Columbia University. She obtained her PhD at the Department of Psychiatry, Federal University of São Paulo, Brazil. Her research is based on innovative and large-scale population-based studies designed to generate knowledge of high public health impact about mental disorders in children and adolescents. In every instance, the goal has been to use state-of-the art sampling, recruitment and assessment methodologies to generate population-based, intervention-relevant information to improve mental health outcomes among underserved, hard-to-reach, frequently understudied populations, with particular emphasis on Latino youth. She has participated in highly influential studies of Latino youth in the U.S., Puerto Rico and Brazil. This work has been supported by agencies such as the U.S. National Institute of Health (NIH), the National Alliance for Research in Schizophrenia and Depression (NARSAD) and the Robert Wood Johnson Foundation (RWJF). Dr. Duarte is also part of international collaborations addressing topics of high importance in global mental health such as child mental health service utilization and awareness or impact of contextual factors on the development of mental disorders. She has published several articles in psychiatric, psychological, public health, and pediatric journals.

Director: Regina Miranda, Ph.D.

Dr. Miranda is an Associate Professor at the Department of Psychology at Hunter College, City University of New York, and Adjunct Assistant Professor of Medical Psychology in Psychiatry at Columbia University Medical Center. Her research seeks to elucidate social-cognitive processes relevant to the onset, maintenance, and treatment of

depression and suicidal behavior in adolescence and young adulthood, by studying the way in which normal thought processes become abnormal. Her research seeks to translate methodology developed in the field of social cognition to the study of important clinical phenomena. Specifically, she is interested in how individuals acquire maladaptive mental representations, or schemas, about the future and about their relationships with others in ways that makes them vulnerable to depression. Her work also seeks to identify characteristics of suicidal ideation that increase risk for future suicidal behavior.

Tutor: Adolf Tobeña Pallarés, M.D., Ph.D.

Dr. Tobeña is full Professor of Psychiatry at the Autonomous University of Barcelona (UAB). Dr. Tobeña is full Professor of Psychiatry at the Autonomous University of Barcelona (UAB). His main research work on the Neurobiology of fearfulness at the Unit of Medical Psychology, School of Medicine, Bellaterra, UAB. Author of 15 books and 160 papers published in journals of Neuroscience, Psychiatry and Psychology. Visiting Professor at the Institute of Psychiatry (University of London), and at the Universities of Groningen, Tel Aviv, Venice, Córdoba (Argentina). Invited lecturer at Spanish Universities, Research Centers and international and local meetings. Regular broadcasting programs and written columns in Barcelona media on scientific topics. City of Barcelona Award, on Science, 1992; "Avui" Award on Scientific Journalism, 1991; "Serra i Moret" Award (Catalonian Government) on Civic Promotion, 1994; European Award "Estudio General" on Scientific Popularization, 2004 (University of Valencia).

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Study 2

Prologue

This Dissertation entitled *Risk Factors for Suicidal Behavior in Adolescence: the Role of Suicidal Ideation* is presented in fulfillment of the requirements for the Degree of Doctor of Psychiatry with the International Doctorate Mention in the Department of Psychiatry and Forensic Medicine at the Universitat Autonoma de Barcelona (UAB), Spain. The two studies included in this dissertation have been elaborated under the supervision of Cristiane Duarte, Ph.D., M.P.H. and Regina Miranda, Ph.D. in the Division of Child and Adolescent Psychiatry in the New York State Psychiatric Institute/Columbia University Medical Campus, New York. Both studies are part of a novel line of investigation that examines the fine-grained details of suicidal ideation in adolescents and their association with future suicide risk. The studies presented in this dissertation are:

1) Study 1: *Incidence, Persistence, and Transitions in Form of Suicidal Ideation in Early Adolescence*
2) Study 2: *Characteristics of Suicidal Ideation that Predict the Transition to Future Suicide Attempts in Adolescents*

Part of the finding of Study 2 have been published in a journal included in the Science Citation Index, and findings from both studies have been presented in several international conferences:

Study 1

- The main findings of study 1 have been submitted and accepted as part of the symposium entitled: *Understanding Factors that Impact the Transition from Suicidal Ideation to Suicide Attempts*, to the 2015 IASR/AFSP International Summit on Suicide

Research that will be held in New York, in October 2015. The title of the oral communication is:

Ana Ortin, MA[1,2], Regina Miranda, Ph.D.[1,3], Hector R. Bird, M.D.[1], Glorisa J. Canino, Ph.D.[4]; Cristiane S. Duarte, Ph.D., MPH[1]. Incidence, Persistence, and Transitions in Form of Suicidal Ideation in Early Adolescence.

[1]Division of Child and Adolescent Psychiatry, New York State Psychiatric Institute, Columbia University Medical Center, New York, NY, USA;

[2]Department of Psychiatry and Forensic Medicine, Universitat Autonoma de Barcelona, Bellaterra, Barcelona, Spain;

[3]Department of Psychology, Hunter College, City University of New York, New York, NY, USA;

[4]Behavioral Sciences Research Institute, University of Puerto Rico, San Juan, Puerto Rico.

- Additional findings exposed in Study 1were presented as part of two research symposia:

1) Ana Ortin, MA[1,2], Hector R. Bird, M.D.[1], Glorisa J. Canino, Ph.D.[3]; Cristiane S. Duarte, Ph.D., MPH[1]. *Psychiatric Risk Factors for Suicidal Behavior in Puerto Rican Early Adolescents Living in Two Contexts*. Research symposium entitled: Culture, Place, and Health: Findings from a Longitudinal Study of Puerto Rican Youth. Latino Researchers Conference (LRC) in New York in April 2014.
2) Ana Ortin, MA[1,2], Hector R. Bird, M.D.[1], Glorisa J. Canino, Ph.D.[3]; Cristiane S. Duarte, Ph.D[1]. *Suicidal Ideation and Suicide Attempts among Puerto Rican Early Adolescents*. Research symposium entitled: Diversity Considerations in the Treatment and Assessment of Suicidal Behavior. American Psychology Association (APA) Annual Convention in Washington in August 2014.

[1]Division of Child and Adolescent Psychiatry, New York State Psychiatric Institute, Columbia University Medical Center, New York, NY, USA;

[2]Department of Psychiatry and Forensic Medicine, Universitat Autonoma de Barcelona, Bellaterra, Barcelona, Spain;

[3]Behavioral Sciences Research Institute, University of Puerto Rico, San Juan, Puerto Rico.

Study 2:

- The main findings reported in this study have been published in the following article:

Regina Miranda[1,2], Ana Ortin[1,3], Michelle Scott[4], David Shaffer[1] (2014). *Characteristics of Suicidal Ideation that Predict the Transition to Future Suicide Attempts in Adolescents.* Journal of Child Psychology and Psychiatry, 55 (11): 1288–1296 (Impact factor: 5.669) (Appendix).

[1]Division of Child and Adolescent Psychiatry, College of Physicians and Surgeons, Columbia University Medical Center, New York, NY, USA;

[2]Department of Psychology, Hunter College, City University of New York, New York, NY, USA;

[3]Department of Psychiatry and Forensic Medicine, Universitat Autonoma de Barcelona, Bellaterra, Barcelona, Spain;

[4]School of Social Work, Monmouth University, West Long Branch, NJ, USA

- Part of the findings of Study 2 have been also presented in two conferences:

1) Ana Ortin, M.A.[1,3], Regina Miranda, Ph.D.[1,2], Michelle Scott, Ph.D.[4], David Shaffer, F.R.C.P., F.R.C.Psych1. Oral communication: *Characteristics of Suicidal Ideation Associated with the Transition to Suicide Attempts in Adolescence.* International Academy of Suicide Research (IASR) 2013 World Congress on Suicide in Montreal, June 2013.

2) Ana Ortin, M.A.[1,3], Regina Miranda, Ph.D.[1,2], Michelle Scott, Ph.D.[4], David Shaffer, F.R.C.P., F.R.C.Psych1. *Poster: Which Characteristics of Suicidal Ideation Predict Suicide Attempts in Adolescents?* 167th Annual Meeting of the American Psychiatric Association (APA) in New York, May 2014.

[1]Division of Child and Adolescent Psychiatry, College of Physicians and Surgeons, Columbia University Medical Center, New York, NY, USA;

[2]Department of Psychology, Hunter College, City University of New York, New York, NY, USA;

[3]Department of Psychiatry and Forensic Medicine, Universitat Autonoma de Barcelona, Bellaterra, Barcelona, Spain;

[4]School of Social Work, Monmouth University, West Long Branch, NJ, USA

Abstract

Introduction:

Adolescent suicidal ideation (SI) is a complex phenomenon that involves continuum of severity; however, in extant research this complexity has been overlooked. It remains unclear how SI progress along the continuum of severity (*Study 1*); and whether specific characteristics of SI predict the transition to future suicide attempts (SA) (*Study 2*).

Objectives:

(*Study 1*) To explore: 1) the distribution and progression of SI along a continuum of severity (*passive ideation, serious ideation, and suicide plan*) in early adolescence over 3-waves of assessment; 2) whether SI forms, minority status, gender, or psychiatric disorders at wave 1 predict SI at waves 2 and/or 3 (follow-up); 3) whether minority status, gender, or psychiatric predict SI at follow-up among adolescents without suicidal behavior at wave 1.

(*Study 2*) To examine: 1) whether several forms of inquiry on a screen for SI differentially predict risk for a SA over a 4–6-year follow-up period among adolescents; 2) the specific characteristics of SI that best predict a future SA among a subsample of ideators.

Methods:

(*Study 1*) Adolescents (N=1,221; 48% girls) aged 10-13 years at wave 1, residing in the South Bronx, New York (minority status) and San Juan and Caguas, Puerto Rico,

were assessed yearly for 3 waves. Past-year SI forms, SA, and selected psychiatric disorders were assessed with the DISC-IV.

(*Study 2*) Adolescents (N=506, 61% female) identified as part of a high school screening in the New York City metropolitan area. Teens completed the Columbia Suicide Screen, selected modules from the DISC-2.3, the Beck Depression Inventory. Adolescents with SI at baseline (N=122) also completed the Adolescent Suicide Interview, which inquired about characteristics of their most recent SI episode. Adolescents were followed up 4-6 years later and assessed for any SA since baseline.

Results:

(*Study 1*) Full-adjusted multinomial logistic regression analyses revealed that passive ideation at wave 1 significantly predicted passive (OR=2.5) and active ideation (OR=2.7) at follow-up. Active ideation (*serious ideation with/without plan*) showed the strongest association with passive ideation (OR=3.9) and active ideation (OR=26.0) at follow-up. Mood disorders were significantly associated only with passive ideation (OR=3.1), while anxiety and disruptive behavior disorders were significantly associated with active ideation (OR=3.8; OR=2.6, respectively) at follow-up. Among adolescents without suicidal behavior at wave 1, anxiety disorders and minority status predicted incidence of SI (OR=2.1; OR=2.4, respectively).

(*Study 2*) Thinking about suicide *often* (OR=3.5), *seriously* (OR=3.1), and *for a long time* (OR=2.3) were associated with a future SA, adjusting for gender, psychiatric disorders, and SA history at baseline. Only *SI frequency* remained significant (OR=3.6) when also adjusting for *currency*, *seriousness*, and *duration*. Among ideators, ideating *1 hour or more* (vs. less) was associated with a future SA (OR=3.6), adjusting for gender,

depressive symptoms, SA history, and other SI characteristics at baseline, and it was also associated with making a SA earlier.

Discussion:

Our findings suggest that early adolescents with passive ideation were at risk of transitioning to more severe ideation. The low rate of active ideation at this age may open a window to implement strategies that curb the progression along the continuum of severity, by targeting mood disorder to decrease risk of passive ideation; and anxiety and disruptive behavior disorders to prevent active ideation. Assessment of ideators at greatest risk of engaging in future SA should include inquiries about the length of a typical SI episode. Identifying specific SI characteristics that predict risk of future SA is a critical step in prevention, especially among adolescents without previous SA.

Introduction

Introduction

1. Overview to the problem

Adolescent suicidal behavior is an important public health problem. Even when not lethal, suicide attempts can lead to serious long-term physical injury or psychological suffering. Rates of suicide attempts and completions in adolescents have been increasing since the 60's, and since 2011 suicide is the second leading cause of death among adolescents and young adults between the ages of 10 and 24 in the U.S. (Centers for Disease Control and Prevention, WISQARS [CDC, WISQARS], 2012). Data on suicidality is necessary for planning national health care policies as well as for evaluating efforts to reduce the rate of suicide.

Transition to adolescence marks a sensitive developmental period with increased risk of onset and worsening of mental health problems, such as substance use, depression, suicidal behavior, and psychotic and maniac episodes (Merikangas & Swanson, 2010). Importantly, suicidal ideation (SI) and suicide attempts (SA) are more frequent in adolescence than in any other period through the lifespan (Lewinsohn, Rohde, Seeley, & Baldwin, 2001; Steinhausen, Bosiger, & Metzke, 2006), making adolescence a key target for research and clinical interventions aimed at understanding and prevent this worldwide phenomenon.

Even though suicidal behavior may affect any youth, some groups are at higher risk than others. In terms of gender, girls show higher SI and SA rates compared to boys; conversely, boys die by suicide more frequently than girls (Boeninger, Masyn, Feldman,

& Conger, 2010; Reinherz et al., 1995). This well–established phenomenon has been called the "gender paradox".

Racial/ethnic variations in suicide rates also exist. In the U.S., historically, white youth have had higher suicide rates than other ethnic groups; however, within the last two decades, youth belonging to racial/ethnic minorities in the U.S. – particularly Latino girls – have been showing a progressive increase in suicidal behavior (Joe, Baser, Neighbors, Caldwell, & Jackson, 2009; Joe & Kaplan, 2002; Rew, Thomas, Horner, Resnick, & Beuhring, 2001; Shaffer, Gould, & Hicks, 1994; Tortolero & Roberts, 2001) Latino youth show higher SI and SA rates compared to their White, African-American, and Asian counterparts (CDC, Youth Risk Behavior Surveillance [CDC, YRBS], 2013, Eaton et al., 2008). In fact, Latino girls outnumber males and girls form other racial/ethnic groups in terms of SI and SA risk (CDC, YRBS, 2013). These numbers are particularly troubling given that Latino youth are one of the fastest-growing minority groups in the United States (U.S. Census Bureau, 2009). Acculturation and other culturally related experiences might play a role in explaining the higher rate of suicidal behavior among young Latino girls (Zayas, Lester, Cabassa, & Fortuna, 2005).

Numerous risk factors are associated with youth suicide. One of the strongest single predictors of future attempts is past history of attempts (Gould, Greenberg, Velting, & Shaffer, 2003; Groholt, Ekeberg, & Haldorsen, 2006). However, over half of suicides among adolescents are first-time attempts (Brent, Baugher, Bridge, Chen, & Chiappetta, 1999; Shaffer, Gould, et al., 1996), and not all adolescents who think about suicide go on to act on these thoughts. These two facts lead us to focus on other potential risk factors that may be related to the onset and persistence of SI and the transition from SI to SA. Psychiatric disorders, for instance, have been studied extensively. The psychiatric

conditions that have been consistently associated with suicidal behavior in adolescents are mood, anxiety, conduct, and substance abuse (alcohol and drug) disorders (Bridge, Goldstein, & Brent, 2006). However, these conditions affect suicide risk at different levels (ideation vs. planning vs. attempts) (Nock et al., 2013). Comorbid conditions, especially comorbidity between mood and anxiety or disruptive disorders, increase suicide risk even more (Foley, Goldston, Costello, & Angold, 2006; Gould et al., 1998; Lewinsohn, Rohde, & Seeley, 1996; Nock et al., 2013; Wunderlich, Bronisch, & Wittchen, 1998).

Suicidal ideation also has been associated with future ideation (Kerr, Owen, & Capaldi, 2008; Kerr, Owen, Pears, & Capaldi, 2008) and attempts (Reinherz et al., 1995; Reinherz, Tanner, Berger, Beardslee, & Fitzmaurice, 2006), even after controlling for psychiatric diagnosis (Lewinsohn et al., 2001; Wichstrom, 2000). The transition from ideation to attempts usually happens within the first year from the onset of ideation (Kessler, Borges, & Walters, 1999; Nock et al., 2013), and lower age of onset of death wishes has been associated with increasing severity along a continuum of suicidal behavior, from death wish to suicidal ideation, suicide plan and attempt (Thompson, Dewa, & Phare, 2012). In the previous studies, suicidal ideation has been defined as presence/absence of ideation in a dichotomous question or combining different dichotomous questions about different forms of ideation in one variable, or as a continuous variable measuring severity of ideation in rating scales (Lewinsohn, Rohde, & Seeley, 1994; Miranda & Shaffer, 2013; Prinstein et al., 2008). Little attention has been paid to disentangle which forms of ideation, in the continuum of SI severity (passive ideation, serious ideation and suicide plan) and SI characteristics (e.g., frequency, duration), may predict greater risk of future ideation and attempts (Miranda & Shaffer, 2013).

In sum, early adolescence is a critical period for the onset of suicidal behavior and higher suicide risk. In order to implement prevention and intervention strategies which can effectively stop the progression along the continuum of suicidality, it is crucial to understand how the different forms of ideation emerge and transition from less (e.g., passive ideation) to more severe forms (e.g., serious ideation and suicide plans). Moreover, knowing which specific characteristics of the suicidal ideation are associated with future suicide attempts will improve the clinical management of adolescents who present with suicidal behavior. Finally, given the growing Latino population in the U.S., it is particularly important to shed light on the risk factors, including minority status and psychiatric disorders, which make Latino adolescent girls the group with the highest vulnerability to suicide behaviors in the U.S.

2. Definition of suicidal behavior

In his Religio medici (1642), Sir Thomas Browne, a physician and philosopher, was the first to coin the work "*suicide*" He based the word on the Latin *sui* (of oneself) and *caedere* (to kill). The new term reflected a desire to distinguish between the killing of another and the homicide of oneself. Early classifications of suicidal behavior were typologies with causal relationships that incorporated useful clinical and sociological observations; however these classifications were not evidence-based and did not serve the need for a classification system.

Universally accepted definitions of suicide and suicidal behaviors comparable across studies are critical for a low-base rate behavior such as suicide. However a consensus on the definitions has not been reached yet, and the classification systems vary depending on the countries and research groups.

The classification system used in the U.S. was first proposed by the National Institute of Mental Health Center for the Studies of Suicidal Prevention in 1972–1973, refined through subsequent research (O'Carroll et al., 1996), and finally adopted by the Institute of Medicine (Goldsmith, Pellmar, Kleinman, & Bunney, 2002). Based on this classification, *Suicide* is defined as a fatal self-inflicted destructive act with explicit or inferred intent to die. *Suicide attempt* (SA) is a non-fatal, self-inflicted destructive act with explicit or inferred intent to die. *Suicidal ideation* (SI) refers to thoughts of harming or killing oneself. *Suicidal communications* are direct or indirect expressions of suicidal ideation or of intent to harm or kill self, expressed verbally or through writing, artwork, or other means. The more concrete and explicit the plan is and the more lethal the intended method, the greater the seriousness of suicidal communications. *Suicidal threats* are a special case of suicidal communications, used with the intent to change the behavior of

other people. *High-risk groups* are known to have a higher than average suicide rate. *Suicidality* refers to all suicide-related behaviors and thoughts including completing or attempting suicide, suicidal ideation or communications. In the U.S., (non-suicidal) self-injury behavior is viewed as distinct from a suicide attempt and most commonly involves self-cutting without suicidal intent (Nock & Favazza, 2009; Simpson, 1975).

In contrast, in Europe for example, some research groups utilize the broader term of deliberate self-harm (DSF) to denote any intentional non-fatal act of self-poisoning or self-injury, irrespective of degree of suicidal intent (Hawton, Hall, et al., 2003; Hawton, Zahl, & Weatherall, 2003).

In the Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV), suicidal ideation and suicide attempts are considered as "self-mutilation" included in the criteria for Borderline Personality Disorder (BPD) together with non-suicidal self-injury, and diagnostic criteria for Major Depressive Disorder (MDD). However, in DSM-5 suicidal behavior is proposed as a distinct entity (American Psychiatric Association, 2013). The proposed diagnostic criteria for Suicide Behavior Disorder are under Section III: Emerging Measures and Models, in the subsection Conditions for Further Study:

Proposed Criteria

A. Within the last 24 hours, the individual has made a suicide attempt.
B. The act does not meet criteria for non-suicidal self-injury – that is, does not involve self-injury directed to the surface of the body undertaken to induce a relied from a negative feeling/cognitive state or to achieve a positive mood.
C. The diagnoses in not applied to suicidal ideation or to preparatory acts.
D. The act was nor initiated during a state of delirium of confusion
E. The act was not undertaken solely for political or religious objectives.

Although the definition of suicidal ideation proposed before is clear, the way in which has been measured in different studies also raises several problems that we will discuss later in this report.

The lack of consensus hinders the establishment of accurate prevalence figures for these behaviors that hampers progress. It is important to establish the size of the problem, examine the trends in prevalence, identify risk factors, and provide bases for prevention and intervention programs.

3. Prevalence of suicide completion

Suicide is a worrisome cause of death among adolescents. The World Health Organization (WHO) defines suicide as the act of deliberately killing oneself. Worldwide, the WHO estimates that over 800,000 people die due to suicide every year. In 2012, suicide accounted for 1.4% of all deaths in the world (Figure 1), making it the 15th leading cause of death throughout the lifespan and the 2nd among 15-29 year olds globally (WHO, Suicide Data, 2012). Rates of completed suicide among males are higher than among females in all countries with the exception of China.

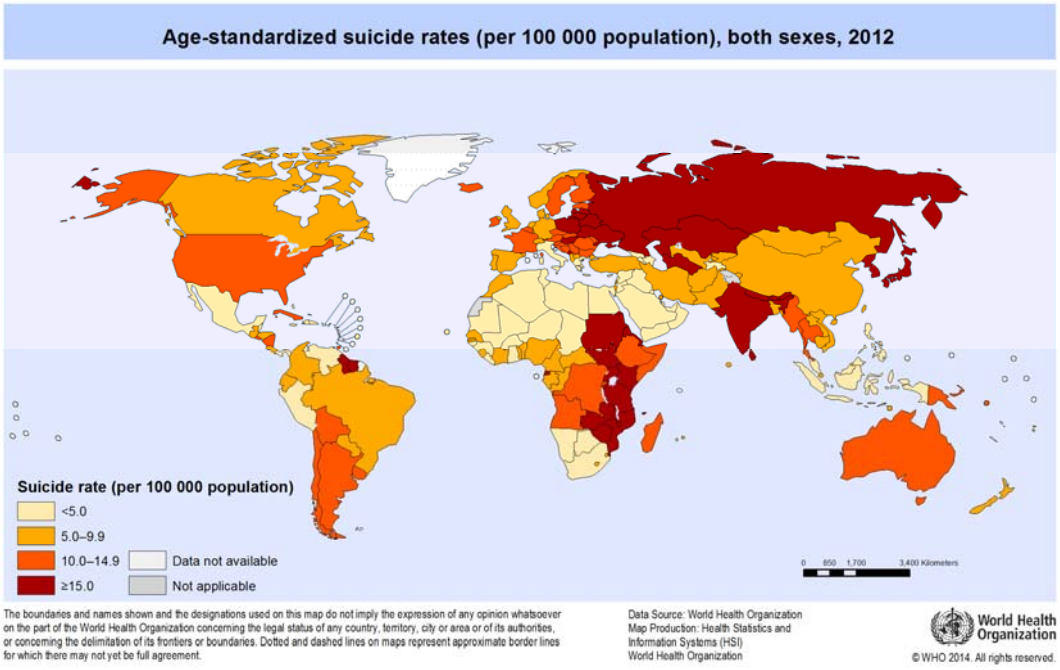


Figure 1. Age-standardized suicide rates in 2012 (Available form WHO Website)

In 1999, the "Call to Action" in the United States (U.S.) already placed adolescent suicide in the group of most important public health problems (U.S. Public Health Service, 1999). Despite this call, in the last decade suicide has become a more serious cause of death among adolescents and young adults between 10 and 24 years. Until 2007, suicide was the 4th leading cause of death among adolescents between 10-14 years and the 3rd among adolescents and young adults between 15-24 years. From 2008 to 2010, suicide was the 3rd cause of death among all the adolescents and young adults (aged 10-24). And in the last 4 years, it has become the 2nd leading cause of death in that age group (CDC, WISQARS, 2012). Between 2003 and 2011, the age-adjusted suicide rate among youth aged 10-24 years in the U.S. was 4.8 per 100,000 persons (CDC, WISQARS, 2012). The top three methods used in suicides of young people include firearm (44.8%), suffocation (40.1%), and poisoning (7.1%) (CDC, WISQARS, 2012). Of the reported suicides in the 10-24-year age group, 81% of the deaths were males and 19% were females. In a review of studies on suicide in childhood, Dervic, Brent, & Oquendo (2008) found that hanging was the most frequent method among children and adolescents aged 14 or younger.

Youth deaths by suicide are only part of the problem. More young people survive suicide attempts than actually die. In fact, whereas the rate of suicide completion is higher among adults over 65, the rate of suicidal behavior (i.e., suicidal ideation and suicide attempts) is higher during adolescence than at any other time in life (CDC, WISQARS, 2012, Miranda & Shaffer, 2013). Moreover, women outnumber men in the rates of suicidal behavior; and in relation to ethnicity/race, Latina girls are the group that present the highest rates of this behavior in the U.S. (CDC, YRBS, 2013).

4. Development trends and distribution of suicidal behavior

4.1. Developmental trends

Marked developmental trends exist in the frequency of suicide behavior. Before adolescence this behavior is extremely rare, but a sharp increase occurs during early adolescence, peaking at the age of 15-16 years (Boeninger et al., 2010; Bolger, Downey, Walker, & Steininger, 1989; Lewinsohn et al., 2001; Nock et al., 2013; Rueter & Kwon, 2005; Steinhausen et al., 2006), followed by a decrease as adolescents enter early adulthood. As a result, the rates of suicidal behavior across the lifespan follow an inverted U trajectory that varies depending on the type of suicidal behavior, SI, plan or SA, and gender.

In an early study on the trends of suicidal behavior, Kosky, Silburn, & Zubrick, (1986) reviewed outpatient records of children aged 15 or less consecutively referred to psychiatric services. Of the total of 1,149 records reviewed, 628 received a positive score for depressive symptoms, and of those, 147 (13%) endorsed SI. Of those 147, 57 (39%) made an SA. In 10 records, SI was present without depressive symptoms. A steep increase in SI was observed among girls in the age group 12 to 13 years and older. The gender difference was not marked until this age.

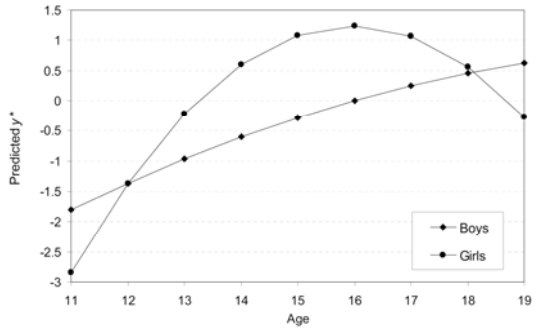
Studies seem to report the age of 10 as the starting point of the sharp increase in suicidal behavior (Bolger et al., 1989; Borges, Benjet, Medina-Mora, Orozco, & Nock, 2008). For example, Nock and colleagues, using the data from the National Comorbidity Survey Replication - Adolescent Supplement (NCS-A) cross-sectional study (n = 6,483, aged 13-18) in the US, showed that before 10 years old, the prevalence of lifetime SI was very low, then it increased thought 12 and more rapidly between 12 and 17 (Figure 2). The prevalence of plans and attempts remained low through 12 years of age, and increased linearly through and 15 and again slowly until 17. Adolescents reported a lifetime prevalence of suicidal ideation, plans, and attempts of 12.1%, 4.0% and 4.1% respectively (Nock et al., 2013). In short, suicidal ideation started increasing earlier and faster, reaching higher rates during adolescence than suicide plans and attempts.

Longitudinal studies support the inverted-U trajectory of suicidal behavior. In the Zurich Epidemiological Study of Child and Adolescent Psychopathology (ZESCAP) longitudinal study, 593 students completed the Youth Self Report (YSR) and the Young Adult Self Report (YASR) along with other self-report questionnaires. The rates at wave 1 of serious SI and SA (past 6-month) were 7.6% and 2.2% (mean age 13.7, SD = 1.6 years), respectively. The rates increased at wave 2 to 10.8% and 3.8% (mean age: 16.7, SD = 1.7 years), respectively, and decreased again at wave 3, with rates of SI of 7.9% and SA of 1.7% (mean age 19.8, SD = 1.7 years), respectively. The stability of any suicidal behavior, from one wave to the subsequent one, was significantly more frequently observed than expected, whereas changes in both directions, from no suicidal behavior to suicidal behavior or vice versa, were less frequent (Steinhausen et al., 2006).

A random sample of 941 students (aged 14-18, 57% girls) was assessed two years in a row and again after turning 24. In the retrospective report on age at the first SA,

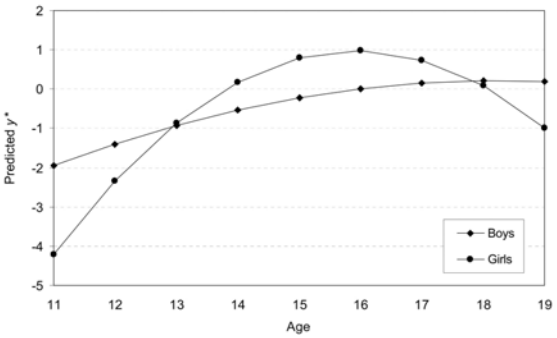
almost 1% of the girls and 0.2% of the boys reported that they were 5-11 years old when they attempted suicide for the first time. In the period of 12-18 years of age, the rates of first time SA increased to 9.9% for girls and 4.2% for boys, and they decreased again in the period of 19-23 years to 3.2% for girls and 1.8% for boys. In the period of ages 5-11 and 19-23, the rates of SA were similar by gender, but in the 12-18 year period, girls endorsed higher rates of SA than boys. First-time SA reached the highest level at the age of 15, this rate remained stable until the age of 20 for boys, and decreased for girls. By the age of 19, the rates for both genders were similar suggesting different developmental trends in SA by gender (Lewinsohn et al., 2001).

In a longitudinal study of 1248 rural European Americans aged 11-19 years, Boeninger and colleagues (2010) plotted the different trajectories of serious ideation, plans, and attempts by gender. Among girls the yearly prevalence of serious suicidal ideation (Figure 2) and plans (Figure 3) followed an inverted U pattern that peaked around the age of 16; whereas among boys the prevalence showed a linear trend with level of ideation increasing through the age of 19. These differences in rates of SI and plans disappeared in late adolescence. For SAs, girls' yearly prevalence peaked at the age of 16 and then declined, and for boys peaked between 16 and 17 before beginning to decline (Figure 4) (Boeninger et al., 2010).



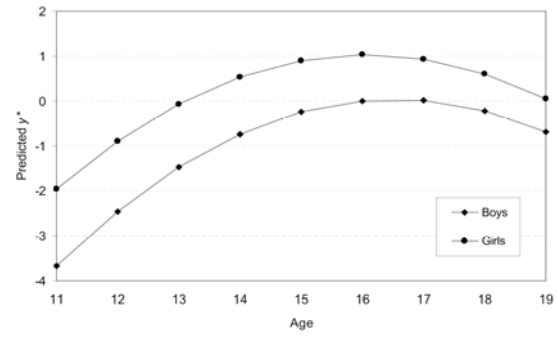
Note: The scale for the y* is arbitrary.

Figure 2. Estimated Trajectories of Suicide Ideation for Boys and Girls (Boeninger et al., 2010) *(Permission to reproduce)*



Note: The scale for the y* is arbitrary.

Figure 3. Estimated Trajectories of Suicide Plans for Boys and Girls (Boeninger et al., 2010) *(Permission to reproduce)*



Note: The scale for the y* is arbitrary.

Figure 4. Estimated Trajectories of Suicide Attempts for Boys and Girls (Boeninger et al., 2010) *(Permission to reproduce)*

4.1. Distribution of suicidal behavior in childhood and adolescence

Little is known about the rates of suicidal behavior among community samples of children younger than 12 years old. First, the little existent data come primarily from psychiatric or population at heightened risk for suicidal behavior (Ben-Yehuda et al., 2012; Borchardt & Meller, 1996; Brent et al., 1986; Kosky et al., 1986; Milling, Campbell, Laughlin, & Bush, 1994). Second, most of the community-based or school-based studies that include children younger than 10 in their samples usually report rates of suicidal behavior for the whole sample and not by age or age group (Boeninger et al., 2010; Foley et al., 2006; Gould et al., 1998; Javdani, Sadeh, & Verona, 2011).

In a high-risk community sample of 131 children (mean age 9.9, SD = 0.5 years) from low-income urban background, largely minority (79% African-American) background, with prenatal exposure to cocaine, O'Leary et al. (2006) found that 14.5% reported thoughts of suicide in the last 2 weeks on the Children's Depression Inventory (CDI). And in another sample of 515 maltreated children (aged 9-11), who entered foster care within the prior year, 16.6% reported lifetime suicidal ideation, 3.9% plans, and 3.7% attempts (Taussig, Harpin, & Maguire, 2014). Finally, Klimes-Dougan et al. (1999) in a 4-wave longitudinal study of 98 pairs of siblings (two cohorts) and their mothers (26.5% bipolar, 42.9% depressed, and 30.6% healthy) found among children 10 years old or younger, the past 6-month rates of lifetime suicidal ideation/plans/SA on the Child Behavior Checklist (CBCL) ranging from 12.6% to 19.1%. Rates the rates of suicidal behavior did not increase significantly with age (the mean age at wave 4 was 17.67 years).

In the first study of community sample of children (n = 101), matched by age and gender with 106 inpatients (mean age 10.5, SD = 1.8), Pfeffer et al. (1984) found that of the 79.2% of the inpatients reported SI and/or SA 6 months before inpatient admission,

while among community children, 12% reported SI and/or SA (8.9% reported SI, 2% suicidal threats, 1% mild suicidal SA and 0% serious SA).

In a recent longitudinal study with a community sample, 206 student boys at high risk for delinquency and their parents were assessed yearly from 9 to 29 years old (youth started reporting on their SI at the age of 12). The highest 6-month rate of SI reported by parents (CBCL) was at the age of 9 (5.8%), and the highest past-week rate by the boys (BDI) was at the age of 13 (16.4%) (Kerr, Owen, Pears, et al., 2008). Although unexpected, they did not explain why the highest rate of suicidal ideation reported by parents was at the child age of 9.

In sum, estimates of the prevalence of suicidal ideation show enormous disparities. This divergence reflects variation in study methodology, such as sample selection or assessment timeframe. They may also reflect differences in report: some studies only include parent report (Min et al., 2012), others parent and child report separately (Brent et al., 1986; Herba, Ferdinand, van der Ende, & Verhulst, 2007; Kashani, Goddard, & Reid, 1989; Kerr, Owen, Pears, et al., 2008; Klimes-Dougan, 1998), and others the combined report (Gould et al., 1998; Taussig et al., 2014; Walker, Moreau, & Weissman, 1990). It is also possible that the differences reflect developmental shifts in SI.

In contrast to literature on child suicide, there is extensive research on suicidal behavior during adolescence. In a systematic review of 128 population-based studies (82.8% school-based) from different countries, with over 90% of the participants were aged 12-20 years old, Evans and colleagues reported mean proportions of lifetime serious ideation of 29.9%, with 19.3% having thoughts in the previous year. The proportion of lifetime and last year plan was 15.6% and 12.4% respectively, and lifetime and last-year SA, were 9.7% and 6.4% respectively. Passive thoughts such as *"thought about being*

dead or dying" were not considered as an indicator of suicide risk so were excluded. Girls reported higher rates than boys, and only in the U.S., Latinos consistently reported higher rates of suicidal behavior compared to Whites adolescents, the latter showing higher rates then Latinos in cross-country comparisons (Evans, Hawton, Rodham, & Deeks, 2005). In another review of studies reporting on epidemiology and risk and protective factors for youth suicide and suicidal behavior, the point prevalence of suicidal ideation was approximately 15-25%, and lifetime estimates of suicide attempts ranged from 1.3-3.8% in males and 1.5-10.2% in females (Bridge et al., 2006).

The most recent Youth Risk Behavior Surveillance (CDC, YRSB, 2013), a nationwide survey of youth in grades 9–12 in public and private schools in the U.S. (n = 13,633), reports that 17% of students reported seriously considering suicide, 13.6% reported creating a plan, and 8% reported trying to take their own life in the 12 months preceding the survey. Each year, approximately 2.7% of the students reported they had made a SA that resulted in an injury, poisoning, or overdose that had to be treated by a doctor or a nurse. The limitation of school samples is that they may miss adolescents who are not attending school for multiple reasons, which in fact may be at higher risk of negative outcomes.

Several hypotheses have been proposed to explain the increase of suicidal behavior in early adolescence, and it has been mostly related to developmental factors. Suicide is extremely rare prior to age 10, in part owing to children's cognitive immaturity. Childhood is a stage of concrete operations, whereby children appraise situations in egocentric and dichotomous ways, lack sophisticated and abstract levels of thinking, and have limited ability to problem-solve, which prevents them from planning and executing a SA, estimating the lethality of the method, and being proficient in their efforts to kill

themselves. Moreover, children have immature views of death (e.g., misconceptions regarding the permanence of death). Research suggests that the understanding of the concept of suicide develops progressively, and by the age of 10 years, most children understand what suicide means. A study of 60 school-aged children identifies that 10% of children in the first grade knew what suicide meant, 50% of third graders understood the concept of suicide, and 95% of fifth graders (10-11 years old) knew what suicide was. They found that the development of the concept of death was related to the development of the concept of suicide (Normand & Mishara, 1992). In another study, 65 children (6-12) (Mishara, 1999) found that by the age of 8-9 years old, children understood the concept of suicide quite well. Fourteen per cent of the children said that they had considered killing themselves in the past, but none of them reported ever making an attempt. The concept of suicide was positively correlated with age, school year, concept of age, negatively with attitudes towards suicide and not related to the concept of life or death. Given the cognitive immaturity of young children, presentation of suicidal ideation or attempts might not mean real intent to kill oneself but rather an expression of helplessness or hopelessness or wish to avoid troublesome situations.

In the few studies on the characteristics of children who died by suicide, victims presented cognitive immaturity, poor reality testing, lack of judgment, impulsivity, also method availability had a critical role. Shaffer et al. (1996) reported that children tended to die under circumstances that suggested a misjudgment of the consequences of a stressful event or crisis. Suicides before the age of 12 were characterized by a brief stress-suicide interval, less planning, and lower suicidal intent (Bridge et al., 2006; Groholt, Ekeberg, Wichstrom, & Haldorsen, 1998; Shaffer, 1988). Children's cognitive immaturity and heightened emotional reactivity during a suicidal episode may preclude them from conceptualizing objective outcomes of their actions.

During adolescence, rates of suicide increase sharply, displaying a shift that is unparalleled across the rest of the life span. There are several explanations for this shift. First, adolescence is characterized by an increase in the number of life events and social pressures that adolescents experience together with a heightened risk-taking drive. Specific experiences such as conflict with peers (i.e., bullying, romantic relationships), academic pressure, and physical sexual abuse in early childhood seems to have a special impact during this period compared to adulthood (Bruffaerts et al., 2010). Also, increased need for individuation weakens the familial support system compared to children. Second, the adolescent also undergoes physical and hormonal pubertal changes that intensify emotional and behavioral states, plus a poor mastery of cognitive (e.g., problem solving) and emotion coping skills (e.g. self-regulation) that are enabled thought cortical development during late adolescence and adulthood (Steinberg et al., 2008; Velez & Cohen, 1988), providing the adolescent with increasing cognitive ability of abstract thinking and planning compared to children (Bridge et al., 2006; Klimes-Dougan et al., 1999). In 2008, Steinberg and colleagues proposed the Dual System Model. This model argues that increased vulnerability to risk-taking during middle is due to the temporal gap between the arousal of the socio-emotional system, which occurs in early adolescence, and the full maturation of the cognitive control system, which takes place in late adolescence. Finally, many mental health problems increase significantly during adolescence and young adulthood (Merikangas et al., 2010). While the onset of impulsive-control disorders, and some anxiety disorders, such as separation anxiety disorder or phobias occurs in childhood, the onset of mood disorders and late-onset anxiety disorders, substance abuse and psychoses, takes place in mid-late adolescence (Brent et al., 1999; Sourander, Helstela, Haavisto, & Bergroth, 2001), lowering the suicide risk threshold.

Reflecting the discrepancy in level of maturity of cognitive processes underlying the planning of SA through the lifespan, children and adolescents seem to be attracted by different means of suicide than adults. Adolescent methods for attempting suicide, compared to adults, tend to be less lethal (e.g., over the counter drugs vs. psychotropic drugs), and adolescents tend to be less certain about the fatal outcome and severe intention (Parellada et al., 2008). There are few reports examining suicide methods in SA in children. In a sample of students aged 5-12 the most frequent method reported was self-hitting or head banging. Examples of suicidal ideas, threats during the interview were: "I wish I was never born", "I want to kill myself, drop dead, fall asleep and not to be here", "I am going to cut my head", and "I am going to go to heaven to be with daddy" (Jackson & Nuttall, 2001). In another sample of children aged 9-11, cutting or stabbing oneself were the most frequent plan and method of SA followed by choking or hanging oneself. A number of children reported planning or attempting to die by getting a person or an animal so angry that they would attack them or by placing themselves in a position to be hurt by an object (e.g., running into a car or tornado). Of note, in none of the studies reviewed did children report planning or attempting suicide via overdose or firearms (Taussig et al., 2014).

4.2. Distribution of suicidal behavior by gender

It is well established that a gender paradox exists with regard to adolescent suicidal behavior: i.e., while suicide rates are higher among boys than girls (3:1), girls have higher rates of suicidal ideation and attempted suicide (WISCARS, 2012, YRBS, 2011; (Wunderlich, Bronisch, Wittchen, & Carter, 2001). Worldwide, the rates of suicide attempts are two to three times higher among female than male youth (Krug, Mercy, Dahlberg, & Zwi, 2002; National Adolescent Health Information Center, 2006; WHO,

Suicide data, 2012). In a 14-year longitudinal community study, 404 children were followed between the ages of 5 to 18. In self-report of serious ideation at the age 15, females were more than twice as likely as males to express thoughts of suicide (30.6% vs. 14.1%) (Reinherz et al.,1995). In the YRBS (2013), the prevalence of having seriously considered SA, made a plan, and attempted suicide in the past 12 months among girls was 22.4%, 16.9%, and 10.6%, respectively; while among males, the prevalence was 11.6%, 10.3%, and 5.4%, respectively.

Several explanations for the "gender paradox" have been propose (Canetto & Sakinofsky, 1998; Langhinrichsen-Rohling, Sanders, Crane, & Monson, 1998; Moscicki, 1994), such as gender differences in the lethality and reversibility of suicide attempt methods, higher frequency of depression and anxiety among girls versus substance use, antisocial disorders, and risk-taking behaviors among boys, earlier pubertal changes in girls, more accurate and honest report of suicidal behavior also in girls, and different socialization practices regarding culturally acceptable forms of self-destructive behaviors by gender. No single explanation appears to adequately account for these differences. Boys, and men in general, tend to employ more lethal methods than women such as firearms or hanging versus drug overdose (Beautrais et al., 1996; Brezo, Paris, Barker, et al., 2007; King, Hovey, Brand, Wilson, & Ghaziuddin, 1997); and girls might have less access to firearms (Kushner, 1985). This may explain the higher rate of suicide completion among boys but not why women have higher rate of suicidal behavior. A possible explanation for the higher rate of suicidal ideation and suicide attempts among girls is their elevated rate of depression (Brent et al., 1999; Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993; Lewinsohn, Rohde, & Seeley, 1993; Lewinsohn et al., 2001; Steinhausen & Metzke, 2003). Suicidal ideation and suicide attempts are important symptoms within the diagnostic criteria for Major Depressive Disorder (MDD) in the most recent and

previous versions of the Diagnostic and Statistical Manual of Mental Disorders (DSM). Research has consistently shown that depression is the diagnosis with the strongest association with suicidal behavior and suicide completion in both adolescents and adults (Brent, Perper, Moritz, Allman, et al., 1993; Garrison, Addy, Jackson, McKeown, & Waller, 1991; Heffner, Kovacs, Klupp, & Mettenleiter, 1993; Marttunen, Aro, Henriksson, & Lonnqvist, 1991; Petronis, Samuels, Moscicki, & Anthony, 1990). Women are also more likely to have suffered sexual abuse or to have been victims of rape than men, which is a clear factor for suicidal behavior in adolescence (Silverman, Reinherz, & Giaconia, 1996; Wunderlich et al., 2001). Wichstrom & Rossow (2002) tried to directly address this question by examining the effect of gender on suicide attempts, controlling for an array of variables that have been proposed that explain gender discrepancies: depressed mood, eating disorders, self-concept, physical self-concept and body satisfaction, gender role identification, early pubertal timing, and involvement in romantic relationships. At baseline, the rate of lifetime SA was 8.7%, and the incidence of new SAs 1 year later was 2.5% of new SAs. At baseline, when depressed mood and disordered eating were entered into the model, the main effect of gender was no longer significant. One year later, the association between new SA and gender became non-significant only when previous SA, depressed mood, physical appearance, pubertal timing and romantic involvement at baseline were entered into the model. These results support the idea that biological, social, and especially psychological factors may be mediating the effect of gender on suicidal behavior.

This gap between the rates of suicidal behavior between girls and boys seems to amplify during adolescence. Most studies have failed to find gender differences in suicidal ideation and suicide attempts in children and early adolescents (Klimes-Dougan et al., 1999; Lewinsohn et al., 2001; Pfeffer et al., 1984; Taussig et al., 2014), or have found the

opposite pattern. In sample of 266 children and adolescents who came to the emergency room for suicidal behavior, the gender profile was the opposite depending on the age of the participant. Of 39 suicidal children (under the age of 12 years), 94% were males and 36% females; and of 227 adolescents (ages 12-18 ages), 26% were males and 74% females. The gender difference between the two age groups was significant (Ben-Yehuda et al., 2012).

4.3. Distribution of suicidal behavior by racial and ethnic groups

Racial/ethnic variations in suicide rates also exist. In the U.S., Native Americans show the highest rates of SA and suicide completion (Bernard, Paulozzi, Wallace, Centers for Disease, & Prevention, 2007). Latino youth show higher rates of SI and SA compared to Whites, African-American and Asian counterparts (CDC YRBS, 2013; Eaton et al., 2008). African-American students report lower rates of ideation relative to White and Latino students, however, their SA rates are higher than White students (CDC YRBS, 2013), and their rates of completed suicide have been increasing in the last two decades (Joe & Kaplan, 2002; Joe, Stein, Seedat, Herman, & Williams, 2008; Shaffer et al., 1994) getting closer to those of White individuals. Rates of suicidal behavior among Asian youth are the lowest. However, the gap between them and their counterparts from other ethnicities is coming closer (Grunbaum, Lowry, Kann, & Pateman, 2000; Hoyert & Kung, 1997). Of all the ethnic and racial groups, Latina girls show worrisomely the highest rates of SI and SA, as can be seen in Figure 5 (CDC, YRBS, 2013; Rew et al., 2001; Substance Abuse and Mental Health Services Administration [SAMHSA], 2012; Tortolero & Roberts, 2001). The reasons why Latino females show this heightened risk suicide risk remains unknown.

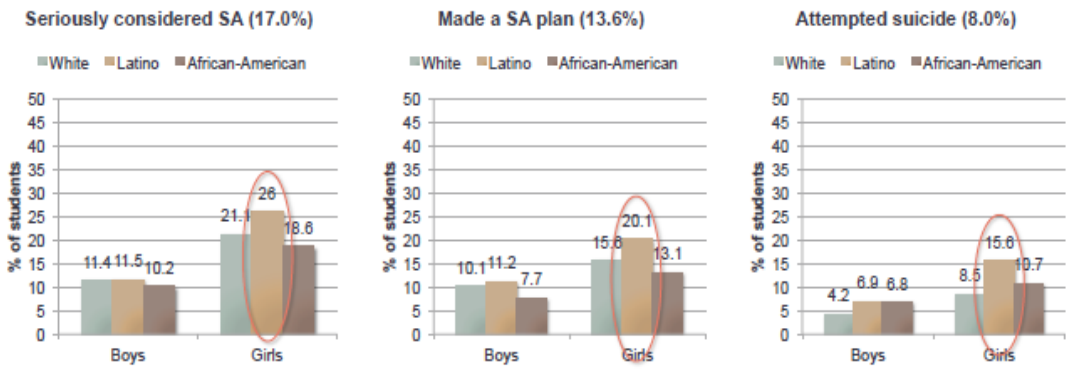


Figure 5. Youth Risk Behavior Surveillance, U.S. 2013 (13,336 students, 9th-12th grade)

These numbers and this absence of explanation are particularly troubling given the increasing size of minority population, with Latinos being one of the fastest growing groups in the United States. According to recent U.S. Census Bureau estimates (U.S. Census Bureau, 2013), Latinos constitute 23.5% of the nation's population 18 years old and younger.

In conclusion, adolescence seems to be a critical period in which the rates of suicidal behavior increase markedly at the age of 10, making adolescence an important target for research and clinical attention of this worldwide phenomenon. During childhood, the prevalence of suicidal behavior seems to be similar in boys and girls but in adolescence there is a shift, and girls show higher rates of suicidal behavior than boys; paradoxically, boys display higher rates of suicide completion. In the US, Latina girls are at higher risk for suicide compared to the other racial/ethnic groups. Given the growing racial and ethnic diversity of the U.S. population, understanding why racial and ethnic minority children and adolescents increasingly engage in suicidal behavior is critical in addressing suicidal behaviors in in adolescence.

5. Risk factors for suicidal behavior in childhood and adolescence

5.1. Past history of SA

Suicidal behavior tends to be recurrent and is a harbinger of suicide completion. Past history of SA is the single most important predictor of completed suicide (Beautrais, 2001; Gould et al., 2003), future attempted suicide (Groholt et al., 2006; Parellada et al., 2008) and suicidal ideation (Roberts, Roberts, & Chen, 1998). Previous SA supposes a 30-fold increased risk for boys and a 3-fold increased risk for girls of dying by suicide (D. Shaffer, Gould, et al., 1996). In a nationwide study (Marttunen, Aro, & Lonnqvist, 1992) they found that 10-44% of the adolescents who died by suicide had made a previous SA, and this was especially frequent among female victims (Marttunen et al., 1995). In the same vein, in a case-control study, Brent et al. (1999) found that suicidal adolescents had significantly more previous SA than controls. Thirty-five per cent of the suicides of those aged 15 years and younger and 42.6% of the suicides of those aged 16 or older had a previous SA compared to their corresponding controls (0% and 1% respectively).

Among those adolescents with previous SA, the rates of reattempting within two years raged around 30-50% (Bridge et al., 2006; Lewinsohn et al., 2001; Shaffer & Piacentini, 1994); with the risk of repetition being the highest during the first 3 to 6 months after the SA (Goldston et al., 1999; Lewinsohn et al., 1996). In a prospective study of 1,508 adolescents, aged 14-18, randomly selected from 9 representative high-schools (Oregon Adolescent Depression Project, OADP), those who attempted at Time 1 were almost 18 times more likely to reattempt at Time 2, two years later (Lewinsohn et al., 1994). Wichstrom (2000) assessed 9,679 students (12-20 years old) two times within two years. At Time 1, 8.2% reported ever having made a SA. At Time 2, 2.7% (n=191) made a SA, and of those, 42 (22%) also had reported a previous SA at Time 1. In multivariate analyses, previous SA was the strongest predictor of future SA (OR, 1.8), followed by suicidal ideation (OR, 1.5) after controlling for depressive symptoms, eating problems, and conduct problems at Time 1, which were no longer significant. Pfeffer et al. (1991) found that 20 (15.0%) of 133 inpatient and non-inpatient adolescents (baseline mean age 10.5, SD = 1.8) made a SA during a 6-8 year follow-up period. Of those 20, 8 (40%) had also attempted at baseline and 10 (50%) made multiple SAs (6 girls and 4 boys). Severity of suicidal behavior at baseline followed by having a diagnosis of mood disorder (at follow-up or lifetime) was the most significant risk factor for attempting at follow-up.

A especially sensitive period for reattempting is after being discharged from mental health services, with studies indicating that approximately 10-18% of the adolescents attempt suicide within the first year after discharge (Brent, Kolko, et al., 1993; King, Kerr, Passarelli, Foster, & Merchant, 2010; King et al., 1995) and around 25% attempt suicide within the 5-years post-hospitalization period (Goldston et al., 1999). In a recent study with inpatient adolescents aged 12-15, 13.5% reattempted within 2 months following discharge, reaching a rate of 23% at 18 months since hospital discharge

(Prinstein et al., 2008). Finally, in another sample of suicidal inpatients, the significantly higher risk for a recurrent episode of SA or SI was within the 2-year period since psychiatric hospitalization compared to non-inpatient children (Pfeffer, Normandin, & Kakuma, 1994). These findings highlight the importance of close monitoring following hospitalization.

Recent longitudinal studies in clinical and community samples suggest that a history of more than one SA increases the risk of a future SA more than history of only one SA (Goldston et al., 1999; Hulten et al., 2001), above and beyond the presence of psychiatric disorders (Miranda et al., 2008).

Specific characteristics of the suicide attempt have been also linked to future risk of suicide completion and reattempts. Longitudinal studies with adults have identified characteristics such as high medical lethality, suicidal intent, stated wish to die, degree of planning, and isolation during the SA as powerful predictors of repetition (Harriss & Hawton, 2005; Runeson, Tidemalm, Dahlin, Lichtenstein, & Langstrom, 2010). Longitudinal studies with adolescents, however, have not typically focused on these SA characteristics. Two longitudinal studies with clinical samples failed to find differences in lethality of the suicide and suicide intent (wish to die) between those who attempted at follow-up and those who did not attempt in short-term (6 month) and long-term periods (15 years later) (Brent, Kolko, et al., 1993; Sapyta et al., 2012). In contrast, in a school-based study, planning an attempt for one hour or longer (vs. less than an hour) and having a serious wish to die (vs. not wishing to die/uncertain) were associated with making a repeated SA within a 4-6-year follow-up period (Miranda, De Jaegere, Restifo, & Shaffer, 2014).

Past history of SA has not only been associated with future SA or suicide but also with recent and lifetime SI. In a cross-sectional study of 5,423 6th-8th-grade students, those with a lifetime history of SA were 5 times more likely to express some recent form of ideation (i.e., thought about death, wished to be dead, thoughts about suicide, suicide plan). The combination of depression and SA history increased the risk of ideation 29-fold compared to those students not depressed and without SA history (Roberts et al., 1998).

In the context, however, two ideas must be highlighted. First, over half of suicide completions among adolescents are first-time attempts (Brent et al., 1999; Shaffer, Gould, et al., 1996). Second, not all the adolescents who think about suicide actually act on their thoughts. This leads us to the need to further explore other risk factors that may be related to onset of SI, and transition from less severe forms of SI to suicidal plans and suicide attempts, such as psychiatric disorders and the forms and characteristics of suicidal ideation.

5.2. Psychiatric disorders

Numerous risk factors are associated with youth suicide, and psychiatric disorders are one of the most frequently studied. Psychiatric disorders are present in up to 80-90% of adolescent suicide victims both in community and clinical settings (Bridge et al., 2006; Shaffer, Gould, et al., 1996). Younger adolescent victims tend to have lower rates of mental illness (Beautrais, 2001; Shaffer, 1974). In a case-control study, Brent et al. (1999), found that 60% of a younger group of suicides, aged 13-15, did not have any detectable psychopathology compared to 89.5% of older youth, aged 16-19, who died by suicide. This difference was statistically significant. Among the younger suicides, mood (42.9%)

and anxiety (22.9%) were the most frequent disorders; while among the older suicides, mood (49%) was followed by substance abuse (42.7%), which was quite rare in the younger group (5.9%).

Similar to completed suicide, in approximately 60-80% of community and referred cases of suicide attempts, there are associated psychopathological conditions (Andrews & Lewinsohn, 1992; Beautrais, Joyce, & Mulder, 1998; Beautrais et al., 1996; Fergusson & Lynskey, 1995b; Foley et al., 2006; Garrison et al., 1991; Gould et al., 1998; Reinherz et al., 1995). Psychiatric conditions that have been consistently related to adolescent SI and SA are mood, anxiety, conduct, and substance abuse disorders (Gould & Kramer, 2001; R. C. Kessler, Borges, et al., 1999; Nock et al., 2013). However, the role of disorders, individually and as a group, varies depending on the developmental stage, the type of suicidal-related outcome, and the transition to a more severe form of suicidal behavior among ideators.

In relation to the suicidal outcome, researchers have also found that some psychiatric disorders seem to differentiate between ideators and attempters (Gould et al., 1998; Javdani et al., 2011), and between single versus multiple attempters (Rosenberg 2005; Miranda et al., 2008; Prinstein et al., 2008). For example, in a cross-sectional community-based study, a random sample of 1,285 youths (aged 9-17) and their parents were interviewed as part of the Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA, Gould et al., 1998). Based on youth and/or parent report on the Diagnostic Interview Schedule for Children, Version 2.3 (DISC-2.3), 7.5% teens endorsed SI only during the previous 6 months, and 3.3% teens had ever made a SA. In the subsample aged 7-12, the rates of SA in the previous 6 months decreased to 0.7%. Among all the diagnostic groups examined, only substance abuse differentiated between both

groups, specifically those adolescents with a substance abuse/dependence disorders were almost 13 times more likely to have ever made a SA compared to ideators (Gould et al., 1998). Lastly, Miranda and colleagues compared adolescents who made a SA at baseline and did not re-attempt at follow-up (n = 30) to those who became multiple attempters (n= 6) 4-6 years later and found that multiple attempters were significantly more likely to meet criteria for anxiety disorders at baseline (Miranda et al., 2008).

Different psychiatric disorders seem to come into play at different times during an individual's development and therefore contribute differently to the suicidal behavior (Borges, Angst, Nock, Ruscio, & Kessler, 2008; Brent et al., 1999; Gould et al., 1998; Steinhausen et al., 2006; Ten Have, van Dorsselaer, & de Graaf, 2013; Wunderlich et al., 2001). The differences in age of onset of the psychiatric disorders and of their rates throughout the lifetime may be underlying the different impact of psychiatric disorders on suicidal behavior depending on the developmental period. The WHO World Mental Health Survey Initiative is a coordinated population survey in 28 countries. Results from these surveys revealed that for impulse-control disorders, such as ADHD and ODD, and some anxiety disorders, such as separation anxiety disorder or phobias, the median age of onset was around 7-14 years. The median age of onset for mood disorders and late-onset anxiety disorders (panic disorder, PSTD, GAD) was 25-50 years. For substance use disorders the median age of onset was 18-29. Psychotic disorders were rare before the age of 14, showing a marked increase in prevalence between ages 15-17. Schizophrenia usually begins in the age range of 15-35. Most of the new onsets of substance use, mood, or later-onset anxiety disorders were secondary to impulse-control or early-onset anxiety disorders (Kessler et al., 2007). Merikangas et al. (2010), using data form the NCS-A, reported that the rates of anxiety and disruptive behavior disorders were already high before the age of 10, but the rates of mood disorders we still low (Figure 6). Moreover,

lifetime anxiety disorders were the most common condition (31.9%), followed by disruptive behavior (19.1%), mood disorders (14.3%) and substance abuse disorders (11.4%). Around 40% of adolescents with one class of lifetime disorders also met criteria for another class of disorders (Merikangas et al., 2010).

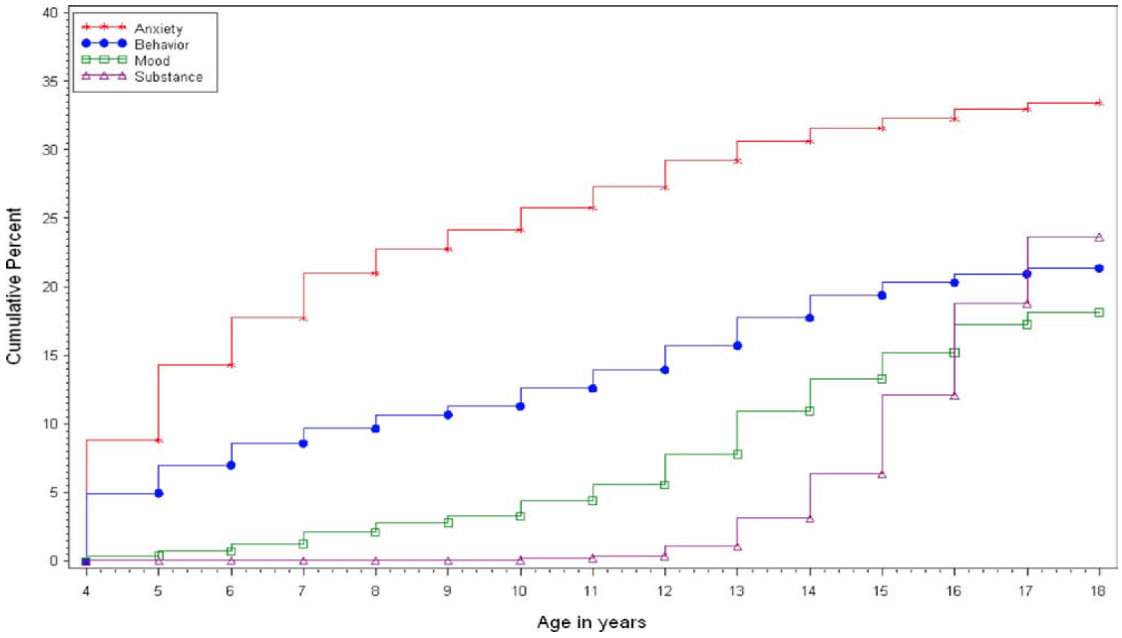


Figure 6. Cumulative lifetime prevalence of major classes of DSM-IV disorders among adolescents (N = 10,123 (Merikangas et al., 2010) *(Permission to reproduce)*

As a visual example of the parallelism between the first onset of a psychiatric disorder, Major Depressive Disorder (MDD), and suicide attempts, see Figure 7 (Lewinsohn et al., 2001).

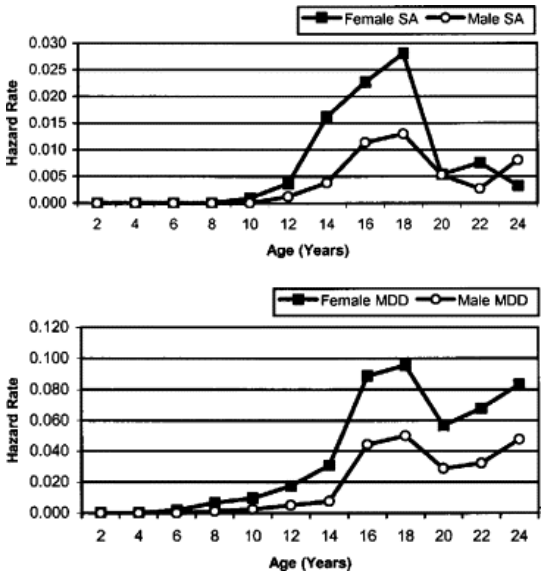


Figure 7. Annual hazard ratio for first episode of SA and MDD as a function of gender (Lewinsohn et al., 2001) *(Permission to reproduce)*

In a clinical sample, Ben-Yehuda et al. (2012) also found that psychiatric disorders were related to suicidal behavior in a different way based on developmental period. Thirty-nine children (under the age of 12) and two hundred and twenty-seven adolescents (12-18 years) who went to the ER for suicidal behavior (SI or SA) were compared in relation to the psychiatric diagnoses that presented at the time of admission. Adjustment disorder was the most common condition in both groups, children (38.5%) and adolescents (32.6%). In children they were followed by ADHD (25.6%) and conduct disorders (23.1%); while in adolescents the second most diagnosed disorder was by unipolar depression (24.8%), followed by conduct disorders (10.1%) (Figure 8). Adolescents presented significantly more comorbidity than children. In light of these results the authors suggested that because of the differences in maturation levels, aggression and impulsivity –central dimension of ADHD and conduct disorders- may play a larger role in suicidal behavior of pre-pubertal children.

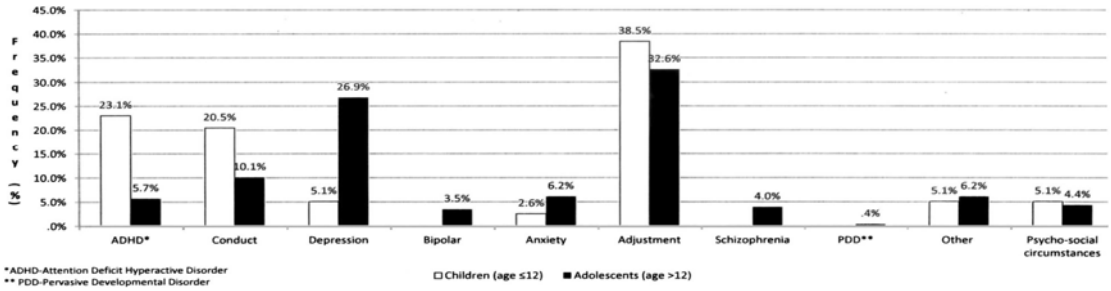


Figure 8. Diagnoses in suicidal children (n = 39) vs. adolescents (n = 227) (Ben-Yehuda et al. 2012) *(Permission to reproduce)*

In a cross-sectional school-based study, Kashani et al. (1989) reported that the symptom count of depression was significantly associated with ideation in the three age groups (8, 12 and 17 years), in both girls and boys. Symptom count of conduct disorder distinguished between ideators and non-ideators only among 12 year-olds and among girls. Finally, symptom count of anxiety was associated with ideation in the 8-year-old group, among girls. Most of the ideators with MDD displayed other symptoms as well. The rates of recurrent thoughts of hurting self and/or committing suicide were 5.7% (age 8), 5.7% (age 12), and 8.6% (age 17).

In the MECA study (Gould et al., 1998), one of the aims was to examine differences by age in the association between psychiatric disorders and suicidal behavior. In those 7-12 years, only disruptive disorders independently increased the risk of SI only – attempts were excluded -, while among those 13 years or older, mood and disruptive disorders independently increased the risk of SI only. Among those aged 12 years or younger, mood and anxiety disorders were significant independent correlates of SA. In the older group, substance abuse/dependence, which occurred exclusively in those older than 12 years, was significantly associated with an increased risk of SA, along with mood and anxiety disorders,

The role of alcohol and other substance abuse in suicidal behaviors is negligible in children and early adolescents, but it is a risk factor for suicidal behavior and completion in late adolescence (Andrews & Lewinsohn, 1992; Brent et al., 1999; Juon & Ensminger, 1997; Vega, Gil, Zimmerman, & Warheit, 1993; Wilcox & Anthony, 2004), being usually comorbid with other disorders such as depression or disruptive disorders, especially among older boys (Bridge et al., 2006).

The association between suicidal behavior and chronicity, severity, and comorbidity between disorders has also been established (Beautrais et al., 1996; Nock et al., 2013; Wunderlich et al., 1998). The Great Smoky Mountains Study (Foley et al., 2006), in a representative of 1,420 adolescents (9, 11 and 13 years old at baseline) assessed annually across 4 waves, showed that risk for any suicidality associated with comorbid profiles was greater than for each individual diagnoses. MDD comorbid with Generalized Anxiety Disorder (GAD) or Oppositional Defiant disorders (ODD) were the two profiles associated with greater risk for suicidality (defined as SI or SA in the last 3 months). However, total symptom load and severity of impairment explained why youth with depression plus ODD were at such increased risk. A limitation of this study is that suicidal ideation and attempts were combined in a unique variable, thus the possible differential contributions of the psychiatric disorders to SI or SA could not be explored.

Also, the association between psychiatric disorders and onset of ideation and transition from thinking about suicide to actually acting on those thoughts in early adolescents remain unclear. Onset of ideation has been mostly explored relying on retrospective-report of the age of onset of each suicidal behavior and using adult or mixed-age samples (Bolger et al., 1989; Bruffaerts et al., 2010). In a longitudinal study including three developmental stages [childhood (6-12), adolescence (15-18) and adulthood (19-

24)], anxiousness in childhood, disruptive disorders, but not mood or anxiety disorders in adolescence, persistence ideation, being female and traumatic experiences, were all associated with early onset of SA (<18 years old) versus late onset (equal or >18 years old) (Brezo, Paris, Barker, et al., 2007). In a national representative sample, youth aged 15-25 at baseline and assessed 10 years later; baseline lifetime disorders (mood, anxiety, substance use, impulsive-control disorders) predicted suicidal ideation at follow-up; though, among ideators, mental disorders did not consistently predicted subsequent suicidal plans or SA. Predictors of suicidal plans were GAD, alcohol dependence, and antisocial behaviors. No individual disorder was associated with SA and baseline psychiatric diagnoses were not associated with onset and persistence of suicidal behaviors at follow-up (Borges, Angst, et al., 2008). Ten Haven et al. (2013) explored onset and transition of suicidal ideation, suicide plan, and suicide attempts in 6,646 adults aged 18-64 years. In this cross-sectional-retrospective study, mental disorders were more powerful risk factors for the onset of SI than for transitions from ideation to plan or SA. However, not all the disorders had the same impact on onset of ideation over time. MDD increased the risk of onset of ideation among respondents aged 13 years and older, and of drug and alcohol abuse among respondents aged 19-29 years old and older, respectively. Among ideators, prior mental disorders were not associated with transitions of suicidal behaviors; only ADHD and traumatic experiences increased the risk of the transition from ideation to plan, and the strongest predictor for the transition from ideation to plan or attempt was the characteristic of prior suicidal ideation, in particular prior plans and no recurrent ideation. Other studies with adults also support that psychiatric disorders are strongly associated with SI, however their association with the transition to plan and SA seems to be weaker and less consistent among ideators (Nock et al., 2008; Nock, Hwang, Sampson, & Kessler, 2010; Nock et al., 2009). These results have recently been replicated in adolescents. In the

NCS-A, Nock et al. (2013) found that only MDD/dysthymia was associated with the development of a plan among ideations, and MDD/dysthymia, eating disorders, ADHD, conduct disorders (for unplanned SA) and Intermittent Explosive Disorder (IED) (for planned SA) were predictors of the transition from ideation to SA. In this article, Nock highlighted that the findings went in line with studies of adult populations in which MDD emerged as the strongest risk factor for SI, while other disorders characterized by anxiety, poor behavioral control and agitation were the strongest risk factors for SA among ideators (Nock et al., 2010; Nock et al., 2009).

In sum, the vast majority of the suicide attempts is preceded by some form of ideation and the association between psychiatric disorders and more severe forms of suicidal behaviors decreases or is no longer significant in the presence of ideation. These findings highlight the value of focusing suicide prevention efforts on the ideation.

"(...) we offer the hypothesis that SI acts as a potenciator of SA in a way that depression, by itself, does not" (Lewinsohn et al., 1996)

"The role of mood disorders on SA may be to a large degree mediatized by SI, a pathway that requires more study" (Brezo, Paris, Tremblay, et al., 2007)

5.3. Suicidal ideation

Suicidal ideation is also one of the strongest predictors of persistent ideation and future suicide attempt (Dervic et al., 2008; Reinherz et al., 2006), even after controlling for psychiatric symptoms (Lewinsohn et al., 2001; Wichstrom, 2000).

Suicidal thoughts are not an uncommon phenomenon during adolescence (Evans et al., 2005), particularly if a broad range of thoughts is considered, from more vague and transient ideation to specific plans with a strong suicidal intent. In a longitudinal multi-ethnic community-based epidemiological study of 521 students (mean age 12.02; SD = 0.43), suicidal ideation was measured with 5 items about thoughts of death, hopelessness, and suicide: "*I thought there was nothing good for me in the future"; "I thought life wasn't worth living"; "I thought about death and dying"; "I thought my family was better off without me"*; and *"I thought about killing myself"*. Over the 18-month study period, 60% of the adolescents endorsed one of the five items. The most frequent one (9-14%) was *"thoughts of death or dying"* and the less frequent (<1%-3%) was the most severe one (*"thoughts of killings myself"*). Ten adolescents reported thoughts of death or suicide in at least 3 waves, 30% were boys and 70% girls (Stoep, McCauley, Flynn, & Stone, 2009). As suggested in this study and already demonstrated before (Lewinsohn et al., 1996; Steinhausen & Metzke, 2004), even the less severe and infrequent forms of SI may increase the risk of poor outcomes later in life, and should serve a sign to prevent future adversity.

Early onset of ideation has been associated with higher severity along the continuum of the suicidal behaviors (Nock et al., 2008). A convenient sample of 2,820 adults (18 to 80 years, mean 45.4, SD = 11.8 years), retrospectively reported on lifetime suicidal wish, thoughts, plans, suicide attempts, and age of onset of each form of SI. Age of onset of the first death wish was negatively correlated with the severity of the suicidal behavior (Figure 9) (Thompson et al., 2012).

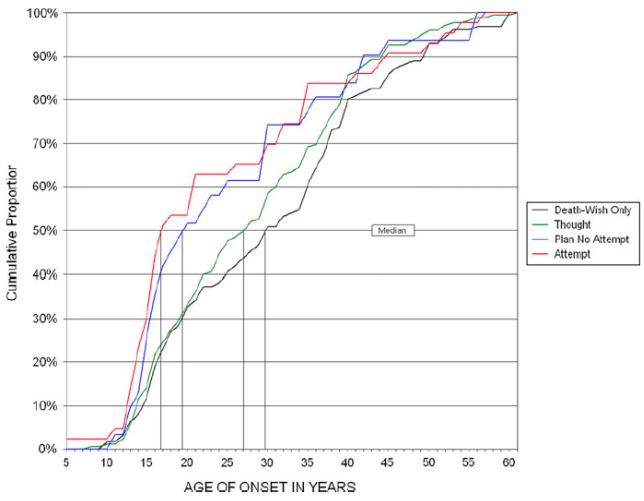


Figure 9. Cumulative age of onset of a death wish by level of suicidal behavior (Thompson et al., 2012) *(Permission to reproduce)*

Similar to the short-term risk of re-attempting after a SA, the first year after the ideation onset is the riskiest period for recurrent ideation. In a series of studies, Kerr explored persistent SI in a selected sample of 209 student boys assessed annually from 12 to 29 years old. Around 18% of them reported SI once, 19.4% at 2 time points, 6.8% at three, and 12.5% four or more. Of those who reported SI at least once, 67.8% endorsed SI again the subsequent year (Kerr, Owen, Pears, et al., 2008). In a subsequent study (Kerr, Owen, & Capaldi, 2008) the more years at which SI was reported, the greater was the risk for subsequent report; also, the more time that had passed since the last report of SI, the greater was the decline in subsequent risk. Those who reported prior-year SI with intent were at higher risk of recurrence. Prior-year SI without intent increased the odds for ideation with intent, and this effect was independent of the risk conferred by prior-year SI with intent. Limitations of these studies were that the sample involved only males at high-risk for delinquency, and the outcome was conceptualized as presence/absence of ideation in the past week.

Population-based studies of adolescents and adults suggest that transition from ideation to attempts occurs within the first year of the onset of ideation. This phenomenon seems to be universal and independent from the developmental period (Borges, Angst, et al., 2008; McKeown et al., 1998; Nock et al., 2008; Ten Have et al., 2013). In a representative sample of adolescents (NCS-A, n = 6,483, aged 13-18), the vast majority of the retrospectively reported transitions from serious ideation to plan (63.1%) and to attempt (86.1%) had occurred within the first year of onset of ideation; and most of the transitions from plan to attempt (88.4%) also had occurred within the year of developing the plan. Although girls showed higher odds of lifetime suicide ideation and SA, they did not differ significantly from boys in either reported transition from ideation to a plan (OR = 1.0) or the transition from plan to attempt (Nock et al., 2013). In a cross-national study involving 17 countries (Nock et al. 2008), 84,850 adults were interviewed regarding suicidal behavior and socio-demographic and psychiatric risk factors. Sixty percent of transitions from serious ideation to plan and SA occurred within the first year of the onset of the ideation. Consistent cross-national risk factors included being female, younger, less educated, unmarried, and having a mental disorder. The strongest association with a psychiatric diagnostics was with mood disorder in the high-income countries and impulse control disorders in the low- and middle-income countries. In these studies, the findings were based on retrospective self-report, which may be subject to recall bias.

Longitudinal studies with assessment intervals, the picture is different: in a 10-year follow-up of a community sample aged 15-54 years old at baseline, the strongest predictor of suicidal ideation at follow-up was a history of prior ideation however baseline lifetime ideation was negatively related to suicide plan and attempt at follow-up. And as Kerr, Owen & Capaldi (2008) suggested, with increasing years since first onset of ideation, the risk of subsequent ideation and plan decreased. In contrast, lifetime baseline suicide

planning was associated with higher risk of subsequent suicide plan. Only a history of suicide attempt was significantly and positively related to suicide attempt at follow-up (Borges, Angst, et al., 2008).

In relation to suicide attempts and other psychopathological outcomes, longitudinal studies with community and clinical samples show that SI, especially when is persistent/chronic, increases the risk of future SA and is a harbinger of impairment, emotional and behavioral problems, as well as psychiatric diagnoses (Brezo, Paris, Tremblay, et al., 2007; Czyz & King, 2015; Fergusson, Horwood, Ridder, & Beautrais, 2005; Lewinsohn et al., 1994; Rueter, Holm, McGeorge, & Conger, 2008). In a population-based longitudinal study of adolescents (6-12 years), the rates of SA when they were 19-24 years old were 12 times higher in transient ideators and 23 times higher in persistent ideators compared to non-ideators (Brezo, Paris, Tremblay, et al., 2007). Rueter et al. (2008) explored the association between 3 trajectories of SI (no ideation, decreased ideation, increased or persistent ideation) and future plans and SAs in a sample of 552 Caucasian adolescents assessed 9 times across a 13-year period (aged 14-17 at baseline). The first two trajectories conveyed negligible risk for moving on to plan or SA. However, around 50% and 25% of the girls in the increaser trajectory made a plan and a SA, respectively. More than half of the boys with increased ideation had made a suicidal plan, but the probability of attempted suicide was non-significant (Figure 10).

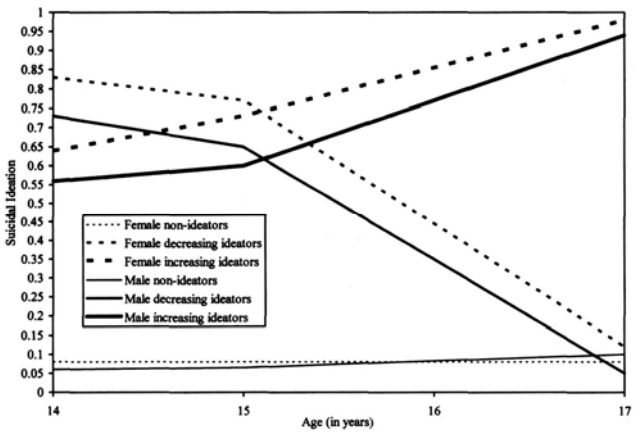


Figure 10. Male and female suicidal ideation trajectory groups (Rueter et al., 2008)

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In clinical samples, a recent study of 376 hospitalized adolescents also found three patterns of SI over a 12-month follow-up period (subclinical ideation, elevated ideation that rapidly declined, and SI that was chronically elevated) based on the total score on a self-report measure of SI. Chronically elevated SI trajectory strongly predicted a future attempt and re-hospitalization compared to subclinical and rapidly declining SI (Czyz & King, 2015). In a sample of 143 hospitalized adolescents (12-15 years old), Prinstein et al. (2008) found that change in SI scores predicted future SAs post-discharge. Moreover, once the trajectories of SI were accounted for, history of SA at baseline was no longer predictor of later SA. On another study, that severity of SI during hospitalization predicted SA during the 12-month period after discharge but only among adolescent girls and not among boys (King, Jiang, Czyz, & Kerr, 2014).

This gender difference on the continuity of suicidal behavior reported by both Reuter et al. (2008) and King et al. (2014) was observed in another study. Student girls who reported SI at the age of 14-18, more frequently reported a SA at the age of 19-23 over and above history of MDD, low self-esteem, and other psychosocial variables. For

males, there were no differences in the rate of SA between those who with SI during adolescence and those who did not (Lewinsohn et al., 2001). King (2014) provides some hypotheses for the lack of predictive validity of SI for boys. One possibility is that the severity of the psychiatric pathology may differ by gender, with girls showing higher rates and severity of depressive symptoms. Another one could be the different cognitive strategies used by boys (e.g., distraction and problems solving) and girls (e.g., rumination) when dealing with stressful situations, with the latter being associated with more severe depressive mood and SI. Finally, girls may be more accurate in their report of SI and more willing to share their experiences in the context of a study.

Presence of ideation also has been associated with future impairment and emotional problems. For example, endorsement of suicidal ideation at any of the 3 time points measured over an interval of 7 years, from preadolescence (ages 6-17) to young adulthood (ages 13-14), increased the likelihood of impaired mental functioning. This was particularly true for persistent and concomitant ideation (Steinhausen & Metzke, 2004). In a longitudinal community study of 404 adolescents (5 years old at baseline) SI at the age of 15 was associated with deficits in behavioral and socio-emotional functioning and psychiatric disorders at the age of 18. Almost 59% of the ideators at age 15 met DSM-III-R criteria for at least one active psychiatric disorder (MDD, social phobia and drug abuse/dependence) in late adolescence (Reinherz et al., 1995). This sample was reassessed again at the age of 30 and the findings highlighted the strong association between SI at the age of 15 and future psychopathology, specially SI and SA, anxiety disorders, behavioral problems, and poor functioning at the age of 30. In addition, males with SI at age 15 showed lower success in same areas than males without SI, such as lower salaries, low socio-economic status (SES), differences not significant between girls with and without SI at the age of 15 (Reinherz et al., 2006).

In conclusion, even the more transient and/or passive forms of ideation (e.g. "I wish I were dead") seem to be relevant to prevent future suicidal behaviors if not also to address current risk (Lewinsohn et al., 1996; Nock et al., 2008; Rueter et al., 2008; Steinhausen & Metzke, 2004; Thompson et al., 2012). However how those thoughts evolve to a more severe form (e.g., serious ideation or suicide plan), and eventually transition to SA still needs further clarification.

5.3.1. Measures of suicidal ideation

The current measurement of suicidal ideation is not exempt of problems and limitations. First, in the extant research, most of the measures of suicidal ideation, as an outcome or as a predictor of future suicidal behavior, have been limited to one question about presence or absence of any previous SI, the combination of various items or ratings in one single variable or total score (Lewinsohn et al., 1994; McAuliffe, 2002; Thompson, Kuruwita, & Foster, 2009; Winterrowd & Canetto, 2013), or have examined changes in summary scores on a scale measuring severity of SI (Pristein et al., 2008, Czyz et al., 2015) among heterogeneous samples of attempters, ideators and not at-risk adolescents.

Second, the terminology of the questions used to assess SI seems to elicit different responses and affects the endorsement rates (e.g., *"Have you ever considered suicide?", "Have you ever considered harming yourself?", "in a period when you were very sad, did you…?", "Have you ever felt so low you thought about committing suicide?"*) (McAuliffe, 2002; Wilcox & Anthony, 2004). A possible solution for this problem would be to categorize the thoughts based on a continuum of their severity or intentionality. The operationalization of the definitions will facilitate the comparison between studies and the calculation of an accurate rate. It will also allow classifying different factors associated with each form of ideation and the transition between them, for example, it will help to

more clearly delineate the precedents of suicidal planning. However in the extant research (third problem), the more passive forms of ideation (e.g., *thoughts about death or people dying, or being dead oneself or not being born*), that do not include the intentionality of killing oneself or making an attempt, has been overlooked in many community- and school- based studies with adolescents (Borges, Benjet, et al., 2008; CDC; YRBS, 2013; Foley et al., 2006; Gould et al., 1998). Instead these studies have included more serious forms of ideation (e.g., *seriously thoughts about committing suicide or killing yourself or making a suicide attempt or wanting to die or ending own life*) and suicide plans (e.g., *thoughts about how to kill yourself or have a plan for exactly how you would kill oneself*). For example, a common instrument used to assess suicidal behavior is the Youth Rating Scale (YSR) for youth and the CBCL for parents. This questionnaire includes suicidal thoughts ("*I think about killing myself*") and acts ("*I deliberately try to hurt or kill myself*") in the preceding six months (Shin et al., 2009). In a systematic review of the suicidal phenomena in adolescents around the world performed by Evans et al. (2005), *"thought about being dead or dying"* were not considered to increase risk of suicide, although previous studies indicated that even the more transient forms of SI seem to increase the risk for suicide (Lewinsohn et al., 1996; Thompson et al, 2012). The exclusion of this kind of thought limited the possibility of understanding the progression along the continuum of suicidality.

Fourth, the current measures of ideation miss the accurate characterization of the nature of SI as it occurs among adolescents whereby there is not empirical data to support, which elements of ideation merit focus in assessments. While a higher score on a measure of SI may tell a clinician that there is "more ideation" present, knowing whether a teenager has a high score on a measure of SI is not necessarily informative about what they are thinking and how they are thinking about it. No measure of adolescent SI, that we are

aware of, focuses specifically on the characteristics of the ideation, such as frequency (i.e., the actual number of times it occurs on a given day or in a given week), duration (i.e., the actual number of minutes or hours it lasts), or chronicity (i.e., whether the SI is acute with quick remission versus occurring in the context of a longer-standing episode). Measures that inquire about these characteristics do so as part of summary scales not meant to focus on these elements of SI. The few studies that have focused on characteristics of SI (e.g., planning, wish to die), have studied it in the context of or after an attempt (Harriss, Hawton, & Zahl, 2005; Kienhorst, De Wilde, Diekstra, & Wolters, 1995; Miranda et al., 2014; Negron, Piacentini, Graae, Davies, & Shaffer, 1997). One cross-sectional study that compared 32 adolescents who presented to an emergency department with SAs to 35 adolescents who presented with SI found that attempters experienced longer duration of ideation but no difference in seriousness of their wish to die, compared to ideators (Negron et al., 1997). A school-based longitudinal study, in which 56 students who reported a suicide attempt on a screening questionnaire were interviewed about their most recent SA, found that planning an attempt for one hour or longer (vs. less than an hour) and having a serious wish to die (vs. not wish to die/uncertain) were associated with over 5 times higher odds of making a repeated SA within the 4-6-year follow-up period (Miranda et al., 2014). However, we are unaware of a study that has characterized the nature of SI among teenagers who have not yet made attempts but who may later go on to do so. Given the lack of studies focused on the characteristics of the SI, there is limited understanding of whether there are SI characteristics that are better in predicting persistence of SI, future SAs, and suicide completion. Thus, among teenagers who endorse SI, knowing the form their SI takes, including chronicity, is informative about their vulnerability to future SAs.

"Overall, this study demonstrates the importance of examining patterns of suicidal ideation in nonclinical samples in order to provide a basis for targeting primary prevention efforts" (Bolger et al., 1989)

"Our findings suggest that one promising research venue may be to examine how specific characteristics of suicidal ideas (intensity persistence and age of onset) are related to suicide attempts" (Brezo, Paris, Barker, et al., 2007)

5.4. Other risk factors for suicidal behavior and complete suicide in children and adolescents

In the section that follows, we examine the literature and describe briefly some of the most important risk factors that have been consistently associated with suicidal behavior and completion in children and adolescents.

5.4.1. Family history of suicidal behavior

5.4.2. Parent psychopathology

5.4.3. Family relationships

5.4.4. Stressful life events

5.4.5. Maltreatment: Physical and sexual abuse

5.4.6. Socio-economic Status

5.4.7. Bullying

5.4.8. Contagion/Imitation

5.4.9. Psychological traits

5.4.10. Availability of the suicide method

5.4.1. Family History of Suicidal Behavior

There is strong and convergent evidence from twin, adoption, and family studies that a suicidal behavior is familial and that the liability to suicidal behavior and completion is transmitted within families over and above the psychiatric disorders (Brent, Bridge, Johnson, & Connolly, 1996b; Brent & Mann, 2005; Pfeffer et al., 1994). A 2–6-fold increased rate of suicidal behavior is found in the relatives of adolescent suicide attempters and suicide victims, even after adjusting for psychopathology in relatives and offspring in cross-sectional (Agerbo, Nordentoft, & Mortensen, 2002; Borowsky, Ireland, & Resnick, 2001; Brent, Bridge, Johnson, & Connolly, 1996a; Gould, Fisher, Parides, Flory, & Shaffer, 1996; Grossman, Milligan, & Deyo, 1991; Johnson, Brent, Bridge, & Connolly, 1998), and prospective studies (Fergusson, Beautrais, & Horwood, 2003). The Danish Registry study found adolescent suicide was almost 5 times more likely in the offspring of mothers who have completed suicide and 2 times as common in the offspring of fathers who have completed suicide, adjusting for parental psychiatric history (Agerbo et al., 2002).

The heritability of youth suicide gains further support from a meta-analysis conducted by McGuffin et al. (2010), who examined a large number of published data on twins thought out the lifespan. They concluded that first-degree relatives of suicides have more than 2 times the risk of the general population, with the relative risk increasing among identical co-twins of suicides to about 11. The estimated heritability for completed suicide was 43% (95% CI, 25–60).

5.4.2. Parental Psychopathology

High rates of parental psychopathology, including depression, substance abuse and antisocial behaviors, are a risk factor for youth completed suicide (Brent, Perper, Kolko, & Zelenak, 1988; Brent, Perper, et al., 1994; Gould et al., 1996), and suicidal ideation and suicide attempts (Fergusson & Lynskey, 1995b; Joffe, Offord, & Boyle, 1988; Kashani et al., 1989). However, some findings are contradictory. When the psychopathology of the youth victim was taken into account, some studies found that parental history of psychiatric disorders still increased the suicide risk (Brent, Perper, et al., 1994), while others did not (Gould et al., 1996). It stills remains unclear how familial psychopathology increases the risk for completed suicide.

5.4.3. Family relationships

Theories and research data suggest that family functioning plays an important role in the etiology and maintenance of adolescent suicidal behavior. There is a consistent literature linking impaired parent–child relationships with increased risk of suicide and suicide attempts among adolescents (Asarnow & Carlson, 1988; Beautrais et al., 1996; Brent, Perper, et al., 1994; Fergusson & Lynskey, 1995b; Fergusson, Woodward, & Horwood, 2000; Gex, Narring, Ferron, & Michaud, 1998; Groholt et al., 1998; Hoberman & Garfinkel, 1988; Kosky, Silburn, & Zubrick, 1990; Lewinsohn et al., 1993, 1994; McKeown et al., 1998; Reinherz et al., 1995; Tousignant, Bastien, & Hamel, 1993).

Since psychiatric problems in the youth may precipitate parent–child discord, it is necessary to disentangle these factors. After adjusting for psychiatric disorders, Gould et al. (1996) still found that suicide victims had significantly less frequent and less satisfying communication with their parents than community controls. However, parent–child

conflict was no longer associated with completed suicide (Brent, Perper, et al., 1994) or attempts (Lewinsohn et al., 1993, Fergusson et al., 2000; McKeown et al., 1998) once they controlled for youth and parental psychological problems.

The precipitants of suicide behavior vary by age. Children's and early adolescents' suicides seem to have fewer precipitants than older adolescents (Brent, Perper, et al., 1994; Groholt et al., 1998). The most common precipitants are parent–child conflicts and disciplinary crisis, whereas romantic difficulties are more common in older adolescents (Beautrais, 2001; Shaffer, 1974), likely because the family is the principal source of emotional support in children. In a retrospective study with college students, Bolger and colleagues found that onset of ideation in childhood was associated with familial precipitants (e.g., parental absence) while onset during adolescence was to non-familial precipitants (Bolger et al., 1989). Moreover, a brief stress-suicide interval seems to be characterized the suicides in children and early adolescents aged 14 years or younger (Groholt et al., 1998).

Quality of parent-child relationship, such as lack of perceived emotional support or parental availability, is also associated with adolescent attempted suicide (Fergusson & Lynskey, 1995a; Tousignant et al., 1993; Wagner, 1997) Conversely, parental supervision, family cohesion, positive parent–child connectedness, and spending time together are protective against suicidal behavior (Borowsky et al., 2001; Resnick et al., 1997).

5.4.4. Stressful life events

Several studies have found that life stressors, such as interpersonal losses (e.g., breaking up boy/girlfriend, loss of a parent to death or divorce) and legal or disciplinary problems are associated with completed suicide (Agerbo et al., 2002; Beautrais, 2001;

Brent, 1994; Brent, Perper, Moritz, Baugher, & Allman, 1993; Gould et al., 1996; Groholt, Ekeberg, Wichstrom, & Haldorsen, 1997; Marttunen, Aro, & Lonnqvist, 1993; Shafii, Carrigan, Whittinghill, & Derrick, 1985) and suicide attempts (Beautrais, Joyce, & Mulder, 1997; Fergusson et al., 2000). For example, Lewinsohn et al. (1996) found a significant association between loss of a parent prior to age 12 and multiple suicide attempts. The contribution of life events remains significant even after adjusting for youth psychopathology and family, social, and personality factors (Beautrais et al., 1997; Brent, Perper, Moritz, Baugher, et al., 1993; Gould et al., 1996). The role of parental divorce on adolescent suicide is not clear yet. Although suicide victims are more likely to come from non-intact families (Andrews & Lewinsohn, 1992; Beautrais, 2001; Brent, 1994; Brent, Perper, et al., 1994; Fergusson & Lynskey, 1995b; Gould et al., 1996; Groholt et al., 1998), the association between separation/divorce and suicide was no longer significant or was markedly attenuated when psychosocial risk factors were taken into account (Beautrais et al., 1996; Brent, Perper, et al., 1994; Fergusson et al., 2000; Groholt et al., 1998).

5.4.5. Maltreatment: Physical and sexual abuse

Both, physical and sexual abuse, are strongly associated with suicide attempts and completed suicide (Borowsky, Resnick, Ireland, & Blum, 1999; Brent et al., 1999; Fergusson, Horwood, & Lynskey, 1996; Kosky et al., 1990; Molnar, Berkman, & Buka, 2001; Wagner, Cole, & Schwartzman, 1995). These associations have been replicated in prospective longitudinal community studies - the most methodologically rigorous design to examine this issue (Brown, Cohen, Johnson, & Smailes, 1999; Fergusson et al., 1996; Johnson et al., 2002; Silverman et al., 1996). Maltreatment has been also associated with increased risk of future mental disorders including depression, conduct, and anxiety

disorder, antisocial personality disorder, substance abuse, and self-destructive behavior (Fergusson et al., 1996).

The population attributable risk of sexual abuse for SAs in adolescents has been estimated to be 16.6–19.5%, with much greater risk for suicidal behavior following more serious sexual abuse, such as intercourse (Brown et al., 1999; Fergusson et al., 1996; Johnson et al., 2002).

Because sexual and physical abuse in childhood may be associated with other reported risk factors for suicide (e.g., parental substance abuse), it is necessary to control for these factors. Physical and sexual abuse remained associated with an increased risk of suicide attempts in late adolescence or early adulthood after controlling for a wide range of potentially confounding factors, such as demographic characteristics, psychiatric symptoms during childhood and early adolescence, and parental psychiatric disorders (Fergusson et al., 1996, Johnson et al., 2002). While the main effect of sexual abuse on suicidal behavior appears to be mediated through an increased risk for psychopathology (Fergusson et al., 2000), there may be an independent effect for both early age of onset and risk of SA, even after adjusting for increased risk for psychopathology and other factors (Borowsky et al., 1999; Gex et al., 1998; Grossman et al., 1991; Molnar et al., 2001).

Bruffaerts et al. (2010) explored the association between childhood adversities and onset and persistence of suicidal behavior and found that the adversities (especially physical and sexual abuse) were most predictive of onset of suicidal behavior during adolescence than at any other time in life.

Finally, the familial transmission of suicidal behavior is more likely if the parent who attempted suicide had been sexually abused as a child, in part because parental history of abuse makes the child more likely to be abused, which then increases his/her risk for SA (Brent et al., 2003). Therefore, abuse is not only a risk factor for suicidal behavior for those abused as children, but also for their offspring.

5.4.6. Socio-economic status

Compared with community controls, suicide attempters have consistently been found to have higher rates of socio-demographic disadvantage, even after controlling for other social and psychiatric risk factors (Beautrais et al., 1996; Fergusson et al., 2000; Wunderlich et al., 1998). However, Agerbo et al. (2002) noted that the effect of socio-economic disadvantage decreased after controlling for family history of mental problems or suicide.

5.4.7. School-related factors

Academic failure, bulling, school drop-pouts, and fear of parent's reaction are common in acute suicidal episodes in children (Bridge et al., 2006). Shaffer et al. (1974) found that among adolescents 14 years old and younger, many suicides occurred after a period of absence from school.

Bullying, being a victim or perpetrator of school bullying, is the most common type of school violence, is related to a broad spectrum of behavioral, emotional, and social problems, and increases the risk of suicidal ideations and/or suicide attempts (King, Horwitz, Berona, & Jiang, 2013; Klomek et al., 2009). Those students who are frequently emotionally abused are more anxious, dissatisfied with school and display more manifest aggressiveness, also the bullied teens can be differentiated from their non-abused peers as

they are manifestly more aggressive and anxious, regardless of whether they suffer emotional or physical abuse.

In contrast, academic achievement and school connectedness are pointed as protective factors against risk for suicidal behavior (Borowsky et al., 2001).

Given that school is one of the most important environments during childhood and adolescence, events related to school may provoke periods of excessive and prolonged stress and therefore deserve attention especially in the context of suicidal behavior with no apparent psychopathology.

5.4.8. Contagion/Imitation

Gould et al. (1990a, 1994) demonstrated that a small but statistically significant number of adolescent suicide completions and attempts occur in time–space clusters, consistent with the mechanisms of contagion and imitation (Gould, Petrie, Kleinman, & Wallenstein, 1994; Gould, Wallenstein, & Kleinman, 1990; Gould, Wallenstein, Kleinman, O'Carroll, & Mercy, 1990). A clutter is defined as a group of suicide attempts or completions that occur closer in time and space than would normally be expected in a given community (Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report [CDC, MMWR], 1988). Publicity about suicide, whether through newspaper accounts, television news reports, or fictional docudramas, is followed by an increase in the rate of suicide and suicide attempt (Gould, 2001; Gould & Shaffer, 1986; Phillips & Carstensen, 1986; Stack, 2000).

Since 1990, the effect of the media on suicide rates has been documented in other countries besides the U.S., including Germany (Jonas, 1992), Austria (Etzersdorfer, Sonneck, & Nagelkuess, 1992), Australia (Hassan, 1995), and Japan (Ishii, 1991), adding

to the extensive work prior to 1990 in the U.S. on television news reports, fictional dramatizations, and newspapers.

Evidence continues to grow from studies of suicide clusters and the impact of the media, supporting the existence of suicide contagion. Several studies have reported significant clustering of suicides, defined by temporal-spatial factors, among teenagers and young adults (Gould, Wallenstein, & Kleinman, 1990; Gould, Wallenstein, Kleinman, et al., 1990).

Factors that increase the likelihood of imitation are the amount, duration, and prominence of media coverage, notoriety of the victim, characteristics of the stories, individual reader/viewer attributes, and social context of the stories (Gould, 2001; Stack, 2003). The impact of suicide stories on subsequent completed suicides appears to be greatest for teenagers (Brent et al., 1989; Gould, 2001; Gould et al., 1994; Gould, Wallenstein, Kleinman, et al., 1990; Phillips & Carstensen, 1986; Stack, 2000). There is also some evidence that imitation may be method-specific (Schmidtke & Schaller, 2000). Presenting suicide in a factual light (i.e., related to mental disorder) as compared to romanticizing suicide was associated with a lower risk of imitation (Stack, 2005).

5.4.9. Psychological traits

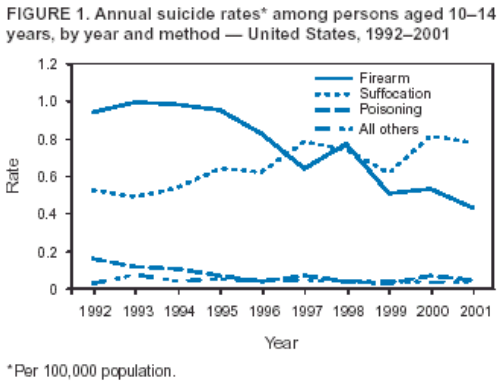
Some psychological traits have been shown to predispose to suicidal behavior. Impulsivity is one of the most frequently studied traits in the genesis of suicidal behavior (Apter, Bleich, Plutchik, Mendelsohn, & Tyano, 1988; Beautrais, Joyce, & Mulder, 1999; Javdani et al., 2011; Kashden, Fremouw, Callahan, & Franzen, 1993). However some studies have shown mixed findings, and the association between impulsivity and suicidal behavior does not always remained significant after controlling for psychopathology

(Horesh, Gothelf, Ofek, Weizman, & Apter, 1999; Javdani et al., 2011; Renaud, Berlim, McGirr, Tousignant, & Turecki, 2008). Beautrais et al. (1999) found that the association between impulsivity and adolescent suicidal behavior was attenuated after adjusting for neuroticism, hopelessness, external locus of control, extroversion, and self-esteem. In a case-control study, after controlling for depression, impulsivity remained significantly associated with suicide risk in the juvenile detention group, but not in the inpatient group (Sanislow, Grilo, Fehon, Axelrod, & McGlashan, 2003).

Other personality traits such as, neuroticism, sensation seeking, low self-esteem or hopelessness, have also been associated with suicidal ideation and suicide attempts. However their contribution to suicidal behavior decreases or is no longer significant when controlling for psychiatric disorders (Beautrais et al., 1999; Brent, Johnson, et al., 1994; Fergusson et al., 2000; Goldston et al., 2001; Lewinsohn et al., 1994). Ortin et al. (2012) noted that the association between sensation seeking and suicidal ideation and suicide attempts remained significant after controlling for depressive symptoms and substance use problems (Appendix 2).

5.4.10. Availability of the suicide method

Previously in the U.S., firearms were the leading suicide methods in all age groups (Bridge et al., 2006; Gould et al., 2003), but in the last 15 years these methods have been surpassed by suffocation (mostly hanging) among children aged 14 years or younger (Figures 11) (CDC, MMWR, 2001; Lubell, Kegler, Crosby, & Karch, 2008).



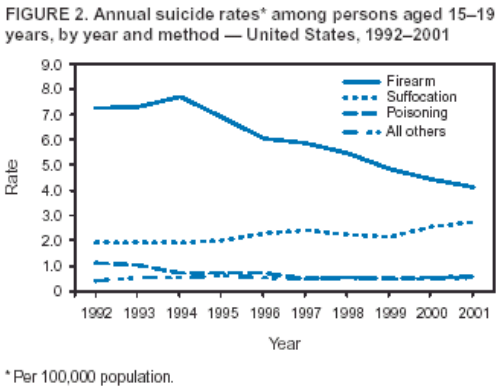


Figure 11. Annual suicide rates among persons aged 10-14 years (FIGURE 1) and 15-19 years (FIGURE 2), by year and method in the U.S. *(Available from CDC, public domain)*

Given that the suicide in children and early adolescents is characterized by a brief stress-suicide interval, the availability of the method has an important role in facilitating the suicide (Brent & Bridge, 2003). Restringing the access to suicide methods is a critical prevention strategy (Gould & Kramer, 2001).

6. Why do Latina girls engage in suicidal behavior so frequently?

In the U.S., Latina girls are at increased risk for suicidal behavior than their Whites, African-American and Asian peers (CDC, YRBS, 2013; Olvera, 2001; Pena, Matthieu, Zayas, Masyn, & Caine, 2012; Rew et al., 2001). Among boys, Latinos also report the highest rates suicide ideation and suicide attempts compared to their counterpart of other ethnicities (CDC, YRBS, 2013), although rates of suicidality are lower among boys than girls.

A traditional approach is to compare the rates of suicidal behavior between different racial and ethnic minority groups and whites. In these studies white teens are usually the largest group in the sample and they are considered as the normative group against which all other groups will be compared. In the last two decades, the vast majority of these studies have found that Latino youth are at higher risk for suicidal behavior than whites (Eaton et al., 2011; Olvera, 2001; Rew et al., 2001; Sorenson & Golding, 1988b; Tortolero & Roberts, 2001). Some studies, however, have failed to find these differences (Roberts, Chen, & Roberts, 1997). Using data from the wave 1 of the National Longitudinal Study of Adolescents Health (Add Health) (n = 3,310, aged 12-19 years), Guiao & Thompson (2004) found that although Latina girls had higher rates of depression and alcohol use than their peers, there were no differences in the rates of suicidal behavior between ethnic groups among females.

Within this comparative framework, a number of risk factors could explain the heightened risk among Latinas. First, compared to whites, Latino youth have higher rates of internalizing disorders (Anderson & Mayes, 2010; Canino & Roberts, 2001; Merikangas et al., 2010; Saluja et al., 2004; Zayas et al., 2005), which are one of the most important risk factors of suicidal behavior. Second, very low rates of utilization and

adherence to mental health services for conditions such as anxiety and depression are well documented among populations of diverse ethnicity and the care that they receive is usually of poor quality (Cauce et al., 2002; Costello, He, Sampson, Kessler, & Merikangas, 2014; U.S. Department of Health and Human Services, 2001). Results from the NCS-A indicated that among 2,899 teens with any disorder, the rate of lifetime service use (i.e., mental health specialty and school services) was 36% for the whole sample. Latinos were significantly less likely to receive treatment for anxiety and mood disorders and to receive frequent service compared to non-Latino white (Merikangas et al., 2011). Freedenthal (2007) focused on service use among 2,226 adolescents (12-17 years, 15% Latinos) with last year ideation or attempts. Almost 30% of the sample had ever received mental health services. Latinos (23%) were less likely to have ever received these services compared to whites (31%). Third, Merikangas et al. (2011) suggested that Latino families are frequently unaware or uncomfortable with mental health services that could help prevent or change this unfavorable trajectory of anxiety disorders in emerging adulthood. However, in the rare instances that treatment or prevention strategies were tailored to the needs, concerns, and values of these families, positive outcomes were achieved (Miranda et al., 2003; Prado et al., 2007).

The problem with this traditional framework is that it has overlooked the influence of factors that do not characterize the white, mainstream society, such as minority status, social class, culture, ethnicity, and race. When ethnic and race factors have been taken into account in this framework, it has resulted in studies explaining developmental deviation from the white class instead of examining normative outcomes within groups. The differences between the ethnic/racial groups have been conceptualized as evidence of cultural inferiority of the minority groups compared to the white mainstream standard, viewing minorities as having defective outcomes (Coll et al., 1996). Although mainstream

studies may have a heuristic value for understanding development in minorities, research requires integrating the unique circumstances that children of color face and are not shared with white children.

Studies looking at differences in suicidal behavior within Latino groups are rare. The few studies in the suicide field have been conducted in adults and found differences between the Latino subgroups, showing that Puerto Rican adults have the highest rates of suicidal behavior compared to other Latino subgroups (Baca-Garcia, Perez-Rodriguez, Keyes, et al., 2011; Fortuna, Perez, Canino, Sribney, & Alegria, 2007; Oquendo, Lizardi, Greenwald, Weissman, & Mann, 2004; Ungemack & Guarnaccia, 1998). These studies argue that Puerto Ricans are more likely to be U.S.-born and more acculturated than the other Latino groups (Fortuna et al., 2007), initiate sexual behavior and childbearing at a younger age, tend to live in poverty (Landale & Hauan, 1996), and show higher rates of depression, substance abuse, and other psychiatric disorders (Alegría et al., 2007; OquendoI, 2004; Velez & Ungemack, 1989) compared to other Latino groups, all of which have been linked to higher risk of suicide. Moreover Puerto Rican women also show higher prevalence of "ataques de nervios", a culturally-bound syndrome that occurs directly in response to an acute stressor and may result in impulsive behaviors such as fainting, crying, trembling, screaming, becoming verbally or physically aggressive, feeling a sense of loss of control, and suicide attempts (Oquendo, Horwath, & Martinez, 1992; Ungemack & Guarnaccia, 1998).

In relation to adolescents, some studies have explored suicidal behavior among Latinos but have not examined subgroups within Latinos (Hovey & King, 1996; Locke & Newcomb, 2005; Pena et al., 2011; Zayas, Hausmann-Stabile, & Pilat, 2009). For example, Razin et al., (1991) compared a group of Latina girls (and their mothers)

admitted in an inpatient unit because of a SA versus a comparison group admitted for other reasons. They found that Latinas who attempted had poor school performance and suffered early losses. However, only a couple of studies have compared Latino subgroups (Roberts et al., 1997; Vega et al., 1993). For example, Roberts et al. (1997) compared Mexican, Central Americans, African-American, Anglo-Americans, Chinese, Indian, Pakistani, and Vietnamese. Among the Latino groups, Mexican had higher prevalence of SI and SA than Central American.

Importantly to Latinos are a large heterogeneous group that share many commonalities such as language, discrimination and immigration experiences; however, they differ in many aspects. For example, the circumstances leading to their immigration, traditions and cultural legacies, the historical and political background of their countries, the geographical location in the U.S., acculturation patterns and their English knowledge, that may affect child outcomes in a different way. Considering minority youth from different countries of origin as a homogenous group might hide the uniqueness of the cultural background and characteristics of each ethnic group. Cross-cultural experts (Coll et al., 1996; Duarte-Velez & Bernal, 2007; McLoyd, 1998), argue that researchers should focus on specific Latino subgroups whenever possible rather than treating Latino participants as if they were all the same to identify their strengths and weaknesses, and design more appropriate interventions for each group.

Studies focused on a specific group of Latinos living in the U.S. are rare (Guiao & Esparza, 1995; Ng, 1996; Swanson, Linskey, Quintero-Salinas, Pumariega, & Holzer, 1992; Winterrowd, Canetto, & Chavez, 2010), and most them have been done with Mexican-American adolescents. Ng et al. (1996) for example, explored the characteristics of 61 Mexican American adolescents who were admitted in an inpatient unit in Texas after

a SA. Those with higher intent had a history of more frequent SA, had lived fewer years in El Paso, had lived longer with both parents, and at least one biological parent was at home at the time of the SA.

There are also studies on Latinos living in their country of origin (Borges, Benjet, et al., 2008). A study conducted in Puerto Rico explored the psychiatric risk factors for suicidal behavior in two probability samples, one community-based sample (n = 1,896) and one clinical sample (n = 736) of teens, aged 12 to 17. The rate of last year suicidal behavior based on parent and/or youth report was 10.3% in the community sample and 37.9% in the clinical sample. Gender moderated the association between suicidal ideation and psychiatric disorders such that having an anxiety disorder was a risk factor only among girls in the community sample and disruptive behaviors only in boys in both samples (Jones, Ramirez, Davies, Canino, & Goodwin, 2008).

Finally, minority status may contribute to the heighted risk of suicidal behavior among Latina girls in the U.S. But, as mentioned before, minority status in research has been studies by comparing ethnic minorities to whites. This approach is problematic because minority status is confounded with ethnicity and socioeconomic status, among other factors, making it difficult to establish whether observed between-group differences in suicidality are driven by race/ethnicity, minority status, or socioeconomic status.

Garcia Coll et al. (1996) proposed an integrative theoretical model that expands on the mainstream framework by incorporating culturally diverse models to guide the research of minority children (Figure 12). The primary construct of the model is social position that is used to stratify people in the social hierarchy based on their relative importance in the society where they live, and includes factors such as race, social class, or gender. The macro-level effect of social position on developmental outcomes is

mediated though mechanism such as racism, discrimination, and oppression. Mechanisms that, in turn, create segregated residential, economic, social and psychological environments in which minority families live and that may have adverse effects on mental health. Segregation refers to the systematic separation of groups based on attributions made in relation to their social position. The interplay of these three constructs (social position, racism and segregation) creates unique conditions for minority youth development that are not shared with the mainstream culture and create promoting and inhibiting environments (e.g. school neighborhood, health care). Families have to adapt their own culture to the demands placed by of the inhibiting/promoting environments where they live. The resulting adaptive culture, the child characteristic (e.g. age, temperament), and the familial characteristics (e.g., family values) interact to directly and indirectly impact child development.

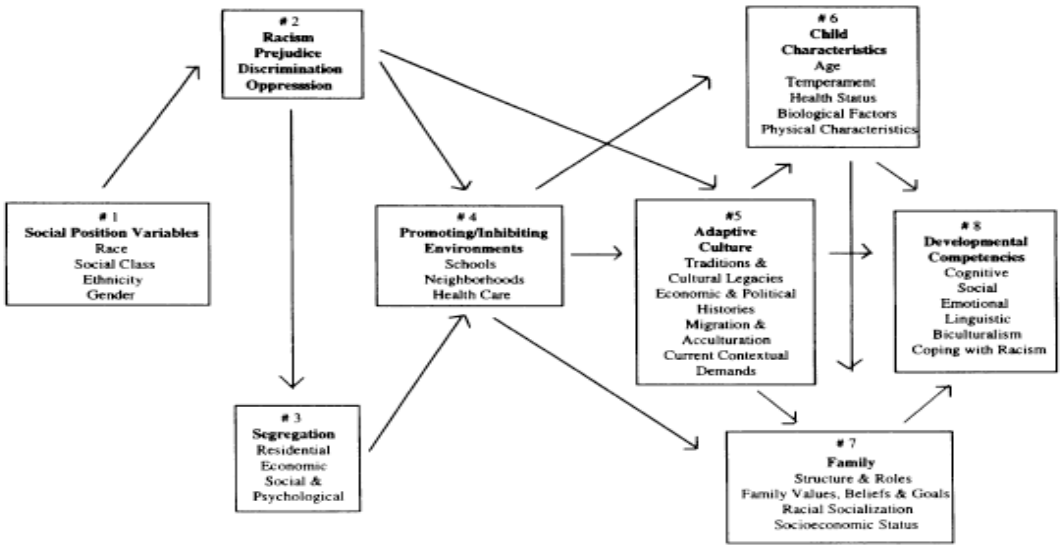


Figure 12. Integrative model for the study of minority children (Coll et al., 1996)

(Permission to reproduce)

Often, Latino children in the U.S. live in segregated contexts in which social problems are clustered, experiencing high levels of poverty, substandard housing, crowded and inadequate schools and health centers, early parenthood and child welfare involvement, high rates of drug and alcohol use in their communities, violence in neighborhood, low levels of employment, and criminal victimization and profiling by law enforcement (Beiser, Hou, Hyman, & Tousignant, 2002; Bourgeois, 2002; McLoyd, 1998; U.S. Census Bureau, 2010; Vega & Rumbaut, 1991). Moreover, the experiences of social marginalization and discrimination are particularly acute for U.S.-raised youth of Spanish-speaking immigrants (Kessler, Mickelson, & Williams, 1999; Pérez, Fortuna, & Alegria, 2008). These disadvantages put minority children and adolescents at a disproportionately high risk for maladaptive behavioral and emotional outcomes, drug use, worse health, teen pregnancy and school drop-out compared to whites (Cauce, Cruz, Corona, & Conger, 2011; McLoyd, 1998; Schwartz & Feisthamel, 2009).

One of the major challenges faced by cross-cultural research is that minority status is confounded with socioeconomic status (SES), making it difficult to disentangle the relative influence of ethnicity, social class, culture, and context on development. For example, it can be argued that a particular ethnic/racial background, and not minority status per se, might contribute to the development of the mental health problems, or vice versa. One way to overcome this challenge and to understand how the context of minority status influences psychological outcomes is by comparing the same ethnic group in their home culture and in their host culture this way they share common values and cultural manners (Stevens & Vollebergh, 2008).

A handful of studies have specifically compared different outcomes between adolescents from the same ethnic/racial background who are living in two social contexts

(minority vs. majority groups). Velez and Ungemack (1989) compared the rates of substance use, and Forehand et al. (1997) the influence of parenting in deviant behavior among Puerto Rican youth living in the South Bronx (New York) and the island of Puerto Rico. Both studies found that minority status increased the risk of negative outcomes. Ramos-Olazagasti et al. (2013) examined how minority status affected the Puerto Rican youth's trajectories of internalizing disorders and found that adolescents living in SB had higher levels of internalizing than youth in PR. With regard to suicidal behavior, there is only one study that compared Mexican youth (aged 11-19) living in Mexico and in the Texas border and found that the latter showed significantly higher rates of SI (23.4%) than their counterparts living in Mexico (11.5%), along with higher rates of depressive symptoms and substance use (Swanson et al., 1992). Based on these finding, especially those reported by Ramos-Olazagasti et al. (2013) and Swanson et al. (1992), we expect to find higher rates of suicidal ideation among those early adolescents living in the SB compared to those living in PR.

In conclusion, Puerto Rican adults have the highest rates of suicidal behavior among Latinos, and significantly higher rates than whites. Minority status may be one of the risk factors underlying these differences. Focusing on a specific Latino group in two contexts varying in minority status, as suggested by Garcia Coll's in her conceptual framework for the study of minorities, may be a promising approach to understanding the development of suicidal behavior in minority Puerto Rican girls living in the U.S. who are at a worrisome suicide risk.

State of the Science

State of the Science

Suicide ideators are a heterogeneous group. Suicidal thinking involves a hierarchy of feelings and a dimension of severity and intent, from those of *"I wish I was never was born"* to the more serious articulation of a suicide plan. Moreover, under the same category of "ideators" we can find adolescents who may experience chronic episodes of unstable ideation with daily fluctuations, as well as others who may be continuously suicidal but for short periods of time. The lack of operational definitions and measures that disentangle the fine-grained characteristics of suicidal ideation hampers progress towards understanding what is in the mind of adolescents when they think about suicide, and how that content evolves over time. It is necessary to move beyond the conceptualization of suicidal ideators as a group and examine different forms of ideation in a possible continuum of severity (i.e., passive ideation, serious ideation and suicide plans) to delineate how specifically progression may take place. Another way to promote a better understanding of the adolescent minds is to focus on the characteristics of the ideation (such as frequency of thoughts, duration of the suicidal episode, or wish to die) in order to identify which ones are associated with future suicide risk.

Suicide rates increase sharply during adolescence, displaying a shift that is unparalleled across the rest of the life span, making adolescence an important target for research and clinical care for this worldwide phenomenon. The rates of most passive forms of ideation start increasing earlier and faster than most severe ones (e.g., suicide plans) and suicide attempts. Transitions from ideation to plans and to suicide attempts mostly occur within the first year of the onset of ideation. Although adolescent girls show elevated rates of suicidal behavior, they do not seem to differ from boys in the patterns of

transitions. Knowledge about differences in developmental timing and progression displayed by the different forms of ideation and suicide attempts should inform the implementation of intervention strategies to prevent passive thoughts from evolving into more active ones. However, little is known about the risk factors that trigger the sharp increase in suicidal ideation and the transition along the continuum of suicidality during early adolescence.

What the extant literature suggests is that suicide ideation and attempts are the strongest predictors of future suicidality, earlier onset of ideation is associated with worse severity in the continuum of suicidality, and the bulk of the suicide attempts are preceded by some form of ideation, suggesting the value of focusing prevention and intervention efforts on ideation. Nevertheless, the study of suicidal ideation to date presents several limitations. First, most of the population-based studies have excluded the more transient and passive forms of ideation, in part because these thoughts can be considered normative at the age when the concept of death is being fully acquired. However in some cases, these passive thoughts may also be reflecting high levels of distress. Second, clinical samples already display severe levels of suicidal behavior and other multiple problems suitable for the investigation of other research questions but not necessarily to inform early prevention models. Third, the study of suicidal ideation has been limited to dichotomous questions or rates on severity rating scales. Studies reporting more details about the characteristics of ideation have assessed ideation in the context of a recent suicide attempt. These studies found that while longer duration of ideation preceding an attempt distinguished between attempters and ideators, and was associated with future risk, *wish to die* showed inconsistent results. No studies that we are aware of have focused on characteristics of SI among adolescents who have not yet made attempts and who are not yet at imminent risk,

in order to disentangle which characteristics deserve more attention because of their heightened risk for future suicidality.

From a developmental perspective, the onset of anxiety and disruptive behavior disorders happens in childhood. These conditions also show the highest prevalence throughout adolescence. Conversely, rates of mood disorders start increasing after puberty. What we know about the association between psychiatric disorders and transitions in suicidal behavior comes mostly from cross-sectional studies with adults and adolescents that rely on retrospective report, most likely influenced by recall bias. These studies posit that psychiatric disorders play a different role along the continuum of suicidality. While mood disorders are associated with suicide ideation, other disorders characterized by anxiety/agitation and problems with impulsive-control seem to replace depression increasing the likelihood that people act on the suicidal thoughts, by planning on how to kill themselves or actually attempting suicide. There is a scarcity of longitudinal prospective studies in early adolescence, with multiple measures of suicide-related outcomes, looking specifically at associations with psychiatric disorders.

In addition, in the US, Latina girls are at a higher risk for suicidal behavior than adolescents from other racial or ethnic groups, and Puerto Rican adults present the highest rates of suicidal behaviors. Belonging to a minority group confers a risk that goes above and beyond the accumulation of socio-economic risks and entails the exposition to a unique ecology of circumstances that the dominant majority groups are not. Based on Garcia Coll's model for the study of minorities and avoiding the heterogeneity that characterize all-encompassing groupings (e.g. 'Latino' or 'Hispanic) by focusing on a specific ethnic group (Puerto Ricans), we use the data of the Boricua Youth Study (BYS) to examine the role of minority status on the development of suicidal ideation. The BYS is

the first epidemiological longitudinal study that permits comparisons of ethnic minority children from the same ethnic group, Puerto Ricans, living in the United States (minority status) and those living in their motherland.

In conclusion, the aim of the present dissertation is to address this gap in the literature by highlighting the importance of focusing on understanding suicidal ideation. Prospective studies in early adolescence that include different forms of ideation are expected to yield more accurate prevalence estimates and illuminate how the progression along the continuum of suicidality happens. These studies are also needed to clarify the role of psychiatric disorders and minority status in triggering the shift in the rates of suicidal behavior and the progression along the continuum of suicidality, when the rates of mood disorders are still very low. Finally, careful study of SI characteristics may yield more information about which adolescents are at risk for making future SAs than has the sole focus on psychiatric diagnosis or on adolescents who have already attempted suicide.

A better understanding of the development, content, and profiles of suicidal ideation will improve the identification of those adolescents who are at higher risk for suicide and facilitate the design of preventive strategies to target specific aspects of the ideation.

Aims of the Dissertation

Aims of the Dissertation

The two studies included in this dissertation address this important gap and expand on the extant literature by examining both, the distribution and progression (incidence, persistence and transitions) of suicidal ideation along a continuum of severity, and the prospective association of the characteristics of suicidal ideation and future suicide attempts, using data from a high-risk community- and a school-based longitudinal study.

Compared to cross-sectional designs, prospective, population-based studies provide a methodologically rigorous design to avoid problems stemming from recall bias, and have greater resolving power with respect to the alignment of temporal sequences of the predictors and the outcomes. These studies are highly valuable for determining the risk factors for suicidal behaviors.

The present dissertation includes two studies:

- Study 1 → *Incidence, Persistence, and Transitions in Form of Suicidal Ideation in Early Adolescence.*
- Study 2 → *Characteristics of Suicidal Ideation that Predict the Transition to Future Suicide Attempts in Adolescents.*

We present Methods and Results for Study 1 and then for Study 2.

Aims Study 1

Incidence, Persistence, and Transitions in Form of Suicidal Ideation in Early Adolescence

Study 1 consists of a secondary data analysis of the Boricua Youth Study (BYS). The BYS is a longitudinal epidemiological study (3 waves), designed to address primarily whether there are differences in rates of disruptive behavior disorders and antisocial tendencies in Puerto Rican children and adolescents living in two contexts: Standard Metropolitan Area of San Juan and Caguas in Puerto Rico (PR) and the South Bronx (SB) in New York City. Children, adolescents and their families were assessed yearly over a 3-year period (Bird, Canino, et al., 2006; Bird, Davies, et al., 2006).

The **specific aims** of this study are the following:

1) First, to examine the distribution and progression of suicidal ideation along a continuum of severity (passive ideation, serious ideation and suicide plan) in early adolescence over three consecutive years of assessment.
2) Second, to explore the prospective association between the severity forms of ideation, minority status, gender, and psychiatric disorders at wave 1 with the forms of ideation reported during the 2-year follow-up period (waves 2 and/or 3).
3) Third, to determine whether minority status, gender or psychiatric disorders increase the risk of incidence of ideation at the follow-up period among those adolescents without suicidal behavior at wave 1.

Hypotheses:

1) While passive ideation will be more prevalent but transient, the severe forms of SI, although less frequent, will show higher rates of persistent ideation during the follow-up period than passive ideation.

2) Serious ideation and suicide plans -combined as active ideation- will be the strongest risk factors for future ideation. Although less strongly, passive ideation will also be associated with future risk of ideation.

   We expect to find a different profile of association between psychiatric disorders and the forms of ideation. Specifically, mood disorders will be associated only with passive ideation and disruptive behavior disorders exclusively with active ideation.

3) Female and minority status will increase the risk for endorsing future SI. However we do not expect to find any differences by gender in the rates of transition between the forms of SI from baseline to follow-up.

   Anxiety disorders will play an important role on the incidence and future risk for ideation in early adolescents, when the rates of mood disorders are still very low.

Study 1 has an additional section (Additional analyses), where we summarize part of the results presented as symposia in two international conferences. The section Additional analyses, including aims, methods, and results, is discussed at the end of the Results section in Study 1.

Aims Study 2

Characteristics of Suicidal Ideation that Predict the Transition to Future Suicide Attempts in Adolescents

The second study of the dissertation consists of secondary data analyses from the Columbia Suicide Screen (CSS) Study. The initial purpose of this longitudinal study was to develop a brief, self-report instrument to assess the most important risk factors for suicide (Shaffer et al., 2004), and to validate it against a diagnostic profile of suicide risk obtained through a well-validated, structured interview. Four to six years later, children were contacted and reassessed again, with special interest in suicidal behavior and psychiatric diagnoses experienced during the follow-up period (Miranda et al., 2008).

This study has two parts (Part 1 and Part 2) that share aims, methods, and analyses. Both parts are presented integrated within the same study.

The **specific aims** to accomplish in Study 2:

1) First, to explore whether different forms of inquiry on a screen for suicidal ideation would differentially predict risk for a suicide attempt over a 4–6-year follow-up period among high school students. The forms of inquiry include questions about currency, frequency, seriousness, and duration.
2) Second, to examine whether there would be specific characteristics of the suicidal ideation that would best predict a future attempt among a subsample of adolescents who endorsed suicidal ideation and who were interviewed in further detail, at baseline, about their most recent episode of ideation. The SI characteristics explored in this study are: timing, frequency, intentionality/wish to die, length, and current wish to die. We also consider other factors, such as disclosure, previous warnings or threats, and treatment received for most recent ideation.

Hypotheses:

To our knowledge, this is the first study that examines the forms of inquiry on a screening tool and the characteristics of the ideation among adolescents who are not yet at imminent risk; therefore, our analyses should be considered exploratory.

What we can hypothesize is that SI characteristics such as longer duration of the ideation or frequent thoughts during the most recent SI episode of ideation will prospectively predict future suicide attempts 4-6 years later. Other characteristics such as intentionality (i.e., wish to die) will have less impact on the long-term prediction of future SA.

Methods and Results

- Study 1 → *Incidence, Persistence, and Transitions in Form of Suicidal Ideation in Early Adolescence.*
- Study 2 → *Characteristics of Suicidal Ideation that Predict the Transition to Future Suicide Attempts in Adolescents.*

Study 1

Incidence, Persistence, and Transitions in Form of Suicidal Ideation in Early Adolescence

Method Study 1

1. Research methodology and study design

The Boricua Youth Study (BYS) is a longitudinal study originally designed to address prospectively the development of disruptive behavior disorders and antisocial tendencies in two populations of Puerto Rican children. Participants were recruited through probability sampling of households in the South Bronx (SB), New York City, and the Standard Metropolitan Area of San Juan and Caguas in Puerto Rico (PR) (Bird, Canino, et al., 2006; Bird, Davies, et al., 2006).

1.1. Study procedures

Participants were recruited thought probability sampling of household in SB and PR. At the time of enumeration a household was eligible if:

1) At least one child residing in the household was 5 to 13 years old and identified by the family as being of Puerto Rican background;
2) At least one of the child's parents or primary caretakers residing in the household also self-identified as being of Puerto Rican background.
3) All of the eligible children per household were selected to participate up to a maximum of 3 children in each household.

A household was excluded if:

1) Child's parents knew that the child was diagnosed as mentally retarded or developmentally disabled.
2) Children had not lived in the households for at least the previous 9 months or were

absent because they were living in another residential setting.

1.2. Baseline and follow-up assessments

Assessments were done at baseline (wave 1) and at two follow-up points, each spaced by 12 months (mean: 349.6 days; SD: 54.6) from the previous wave.

For the entire sample (n = 2,951, age 5–13), the compliance rates at wave 1 were 80.5% for SB and 88.7% in PR (n = 2,491) (Bird, Canino, et al., 2006). Site-specific sample retention in the two follow-ups one year apart was over 85%. In wave 2 compliance rates were 89.4% for SB and 93.8% in PR of wave 1 (n = 2,286). In wave 3, rates were 95.8% for SB and 95.6% in PR of wave 2 (n = 2,187) (Bird et al., 2007).

Forms and procedures were approved by the Institutional Review Boards at the New York State Psychiatric Institute and the University of Puerto Rico Medical School. Detailed information about the study design, sampling, and methodology has been reported by Bird, Canino et al. (2006).

2. Present study

2.1. Sample

The present report analyses the 3 waves of BYS data for adolescents aged 10 to 13 at wave 1 (n = 1,271). A total of 50 (3.9%) adolescents with lifetime SA before wave 1 or lifetime SA at waves 2 or 3 but without any SA in the previous waves, based on adolescent or parent report, were excluded from the sample because no information about their lifetime suicidal ideation was provided.

The final sample for our analysis was 1,221 adolescents (48.4% females) and their caretaker, 46.9% from SB and 53.1% from Puerto Rico, 1,121 adolescents at wave 2 (91.8%), and 1073 at wave 3 (87.9%). Between waves 2 and 3, 169 (13.8%) families dropped out from the study. Compared to those who participated in more than one wave, we did not find differences by gender (52.1% vs. 47.8% girls; X2 = 1.06, p = .30) or age at wave 1 (Mean (SD): 11.6 (1.2) vs. 11.5 (1.19): t = 1.51, p = .13). Of the 169 families who dropped out of the study at wave 3, 61.5% were living in SB and 38.8% in PR at wave 1 (X^2 = 16.81, p = .00).

2.2. Measures

- *Demographics, social status and cumulative risk index*

Demographic characteristics included adolescent age (10 years old or older at wave 1), gender, and site (SB vs. PR). Indicators of family and socio-economic status were measured at each wave and included family structure (single-parent family vs. two-parent family), poverty (above vs. below the Federal Poverty Guidelines), maternal education (less than High School vs. High School or more), and being born from a teenage

mother (>20 vs. ≤ 20 years). A cumulative risk index (CRI) was created by summing up 4 social risks: (1) living in a single-parent family, (2) living below the poverty line, (3) maternal education of less than high school, and (4) having a teenage mother (reported only at wave 1). The CRI ranged from 0 to 4 at each wave (Table 1).

- *Suicidal behavior*

Suicidal ideation (SI) and suicide attempt (SA) were measured at each wave using questions within the Affective Module of the Diagnostic Interview Schedule for Children Version-IV (DISC-IV; DSM-IV version; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000), a structured diagnostic instrument. The adult informant version of the DISC-IV was administered to parents or primary caretakers of all of the children in the study. The youth version was administered to all children 10 years old and older, but not to those younger than age 10, for whom reliability is considered poor (Breton et al., 1995; Fallon & Schwab-Stone, 1994; M. Schwab-Stone, Fallon, Briggs, & Crowther, 1994). Parents and adolescents were interviewed separately by different interviewers at each wave. Presence of any form of suicidal ideation or suicide attempt was considered positive if the adolescent or parent or both answered in the affirmative to the questions included in the Affective Module. The suicidality items were asked to all the adolescents and their parents independently of their answers to previous questions in the same module. These items assessed past-year occurrence of passive suicidal ideation *("In the last year - that is, since [NAME EVENT/NAME CURRENT MONTH of last year] - was there a time when you often thought about death or about people who had died or about being dead yourself?"* and *"In the last year - that is, since [NAME EVENT/NAME CURRENT MONTH of last year] - was there a time when *** said [he/she] often thought about death or about people who had died or about being dead [himself/herself]?"*), serious suicidal ideation *("In the*

last year, that is, since [NAME EVENT/NAME CURRENT MONTH of last year], was there a time when you thought seriously about killing yourself?" and *"In the last year, that is, since [NAME EVENT/NAME CURRENT MONTH of last year], did [he/she] ever talk seriously about killing [himself/herself]?")*, and among respondents who reported serious ideation, suicide plans *("In the last year, did you have a plan for exactly how you would kill yourself?" and "In the last year, did [he/she] say that [he/she] had a plan for exactly how [he/she] would kill [himself/herself]?")*. Past-year SA was assessed with the following item: *"Now thinking about the whole last year - that is, since [NAME EVENT/NAME CURRENT MONTH of last year] - have you tried to kill yourself?"* and "*Now, thinking about the whole last year - that is, since [NAME EVENT/NAME CURRENT MONTH of last year] - has [he/she] tried to kill [himself/herself]?"*; and lifetime SA: "*For the next question, I would like you to think about your whole life. Have you ever, in your whole life, tried to kill yourself or made a suicide attempt?"* and *"For the next question, I would like you to think about [his/her] whole life. Has [he/she] ever, in [his/her] whole life, tried to kill [him/herself] or made a suicide attempt"*. There is evidence that the DISC is a reliable instrument to evaluate children and adolescent suicidal states and associated psychiatric disorders (King, Katz, et al., 1997).

We created five variables to reflect suicidal ideation: (1) *form of ideation* was based on mutually exclusive categories such that each adolescent was classified at each wave based on the more severe form of ideation endorsed by the adolescent or his/her parent: no ideation, passive ideation, serious ideation, or suicide plans. We combined serious ideation and suicide plans (mutually exclusive categories) to create a variable labeled (2) *active ideation*. (3) *Past-year SI* was defined as reporting any form of ideation at any wave. Lastly, (4) *persistent ideation* was defined as reporting any form of ideation at baseline and again at wave 2 and/or 3.

- *Psychiatric disorders*

Psychiatric disorder diagnosis was established based on the adolescent and parent versions of Diagnostic Interview Schedule for Children Version-IV (DISC-IV; DSM-IV version; Shaffer et al., 2000) at each wave. The psychometric properties of the DISC-IV in English and Spanish versions have been tested (Bravo et al., 2001; Shaffer et al., 2000). In this report, a symptom was counted as present if the parent, the adolescent, or both reported it. A disorder was considered as present when symptom criteria and one DISC-IV diagnosis-specific impairment criterion were met. In all age groups, only the adult informant answered the attention-deficit/hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD) schedules, for which the parent is considered to be the optimal informant (Bird et al., 1992). The time frame of the DISC-IV for determining the presence of most psychiatric symptoms is the past 12 months. Threshold disorders were defined according to DSM-IV criteria for 10 selected diagnoses and grouped in three supra-ordinal categories: anxiety disorders (generalized anxiety, separation anxiety, panic disorders, social phobia, and posttraumatic stress disorder), mood disorders (major depression and dysthymia), and disruptive behavior disorders or DBD (ADHD, ODD, and conduct disorder). For DBD, only parental report was considered.

2.3. Data analyses

To evaluate the *distribution of gender, socio-economic risks, and psychiatric disorders by site (SB vs. PR)* two-tailed Chi-square tests were used. T-tests tested whether adolescents living in SB and PR differed according to their age and the cumulative risk index (CRI).

Parent-adolescent agreement on suicidal behavior was estimated using the Kappa statistic. Form of ideation had four mutually exclusive categories: no ideation, passive ideation, serious ideation and suicide plans.

To explore *differences by age (year by year) in the rates of ideation* based on adolescent report, parent report, and the combination of adolescent-parent report at each wave, two-tailed Chi-square tests were conducted. We adjusted the p-value for multiple comparisons (Bonferroni correction).

To explore incidence, persistence and transition between the SI forms, we combined the SI forms reported at waves 2 and/or 3, such that at follow-up each adolescent was classified based on the more severe form of ideation reported at any of those two waves. Age in years and CRI were included as covariates in all the regression analyses. The risk category was coded as '1' and the no risky category as '0' (e.g., Girl = 1, Boy = 0; SB = 1, PR= 0).

First, we display the *distribution of each form of ideation* at follow-up (wave 2 and/or 3) based on the form of ideation endorsed at wave 1. The grey boxes indicated persistence of the same form of ideation at follow-up.

Second, to explore the *risk factors for incidence of ideation* at wave 2 and/or 3 among adolescents without suicidal behavior (no ideation or SA) at wave 1. Univariate (Model 1) and multivariate (Model 2) (Model 2) logistic regression models were run to explore the association between site, gender, and psychiatric disorders with incidence of ideation at waves 2 and/or 3. In a subsequent step, 2-way interactions were entered in the model to explore whether site or gender moderated the association between psychiatric disorders and incidence of ideation.

Finally, to explore *the association of each form of ideation (passive ideation and active ideation), site, gender, and psychiatric disorders at wave 1 with the each form of ideation at follow-up*, univariate (Model 1) and multivariate (Model 2) multinomial regression models were run. Form of ideation at wave 1 was defined as a dummy variable: passive ideation, active ideation, and "No ideation" as the reference category. "No ideation" was also the reference category of the SI forms in the multinomial analyses. Subsequently we explored whether site and gender moderated the association between psychiatric disorders and the SI forms. All odds ratios (ORs) were adjusted for the possible confounding effects of age in years, CRI, and past-year SA. For the models with interaction terms we used "any disorder" instead of each one of the diagnostic groups to reduce the number of predictors.

The analyses were conducted using SPSS 21.0. The results showed in this report and tables are unweighted.

Results Study 1

1. Demographics, socio-economic risks, and psychiatric disorders by site at each wave

As a brief description of the sample, Table 1 shows the distribution of age and gender, socio-economic risks, and psychiatric disorders (wave 1) by site at each wave. Girls and boys were represented in equal proportions at both sites. Early adolescents in SB were significantly more exposed to socio-economic risks than adolescents living in PR. Specifically the adolescents in SB were characterized by more frequently having mothers with less than high-school education, living in one-parent families, and being born from a teenage mother (>20 years). In wave 1, there were more families in PR living below the poverty line (based on the Federal Poverty Guidelines) but this difference became non-significant over time. In relation to the cumulative risk index (CRI), adolescents in SB were significantly more exposed to socio-economic risks (3 or 4 risks; mean CRI, 1.8-1.9) at each wave than adolescents in PR, who were significantly less exposed to risks (0 or 1; mean CRI, 1.4) at each wave.

We also found differences by age, with participants in wave 2 being older in SB compared to PR.

We did not find significant differences in the prevalence of psychiatric disorders by site at any wave (Table 1). At wave 1, anxiety disorders were more prevalent than the other two diagnostics groups, followed by behavioral disruptive disorders, and mood disorders. However, at wave 3, disruptive behavior disorders outnumbered anxiety disorders.

Table 1. Demographics, social risks and psychiatric disorders by site and wave

	Wave 1			Wave 2			Wave 3		
	SB	**PR**	X^2 or t	**SB**	**PR**	X^2 or t	**SB**	**PR**	X^2 or t
Gender, n (%)									
Female	277 (46.9)	314 (53.1)	0.00						
Male	296 (47.0)	334 (53.0)							
Age, mean (SD)	11.6 (1.2)	11.5 (1.2)	1.7+	**12.6 (1.2)**	12.4 (1.2)	3.1**	13.5 (1.2)	13.4 (1.2)	0.98
Socio-economic risks, n (%)									
> High-school (mom)	**256 (62.7)**	152 (37.3)	65.0***	**234 (62.2)**	142 (37.8)	69.0***	**218 (61.1)**	139 (38.9)	56.7***
Poverty	358 (45.0)	**466 (55.0)**	3.9*	354 (45.0)	432 (55.0)	0.01	346 (45.6)	412 (54.4)	0.13
Single motherhood	**278 (59.8)**	187 (40.2)	52.2***	**239 (57.5)**	177 (42.5)	41.0***	**234 (58.5)**	166 (41.5)	46.69
Teen pregnancy	**147 (55.7)**	117 (44.3)	10.4**						
Number of socio-economic risks, n (%)									
0	69 (34.5)	**131 (65.5)**	51.7***	58 (31.7)	**125 (68.3)**	56.5***	21 (28.3)	**129 (71.7)**	58.4***
1	148 (39.5)	**227 (60.5)**		132 (36.6)	**229 (63.4)**		137 (41.1)	196 (58.9)	
2	194 (50.9)	187 (49.1)		158 (49.1)	164 (50.9)		148 (45.1)	180 (54.9)	
3	**121 (57.1)**	91 (42.9)		**126 (60.3)**	83 (39.7)		**119 (64.3)**	66 (35.7)	
4	**41 (77.4)**	12 (22.6)		**32 (69.9)**	14 (30.4)		**31 (66.0)**	16 (34.0)	
CRI, mean (SD)	**1.8 (1.1)**	1.4 (1.0)	7.1***	**1.9 (1.1)**	1.4 (1.0)	7.6***	**1.9 (1.1)**	1.4 (1.0)	7.5***
Psychiatric disorders, n (%)									
Mood	23 (4.1)	42 (6.5)	3.48+	14 (2.8)	22 (3.6)	0.59	14 (3.0)	19 (3.3)	0.08
Anxiety	89 (15.7)	90 (13.9)	0.74	42 (8.3)	57 (9.3)	0.33	34 (7.2)	33 (5.7)	1.05
Behavior	47 (8.2)	64 (9.9)	0.99	44 (8.7)	46 (7.5)	0.54	41 (8.5)	39 (6.7)	1.31

CRI: Cumulative risk index
Significant results are bolded
+ p < .10; *p < .05; ** p < .01; *** p < .001

2. Parent-adolescent agreement on suicidal behavior

Parent-adolescent agreement on the 12-month rates of SI, SA, and severity forms of ideation (passive ideation, serious ideation, and suicide plan, as mutually exclusive categories) is displayed in Table 2. In wave 1 the agreement did not exceed chance levels for past-year passive ideation, suicide plans, and SA. Parent-adolescent agreement exceeded chance levels for past-year serious ideation and past-year SI, although the agreement was small.

In waves 2 and 3 parents and adolescents showed a slight agreement in the form of ideation and past-year SA (except serious ideation in wave 3). Agreement was moderate for past-year SA in wave 2 only.

Table 3. Parent-adolescent agreement on the report of past-year SI and SA by wave

	Wave 1		Wave 2		Wave 3	
	K	*p value*	K	*p value*	K	*p value*
Past-year SI	**0.11**	**.00**	**0.18**	**.00**	**0.17**	**.00**
Passive ideation	0.03	.24	**0.08**	**.01**	**0.10**	**.00**
Serious ideation	**0.07**	**.01**	**0.06**	**.05**	-0.01	.79
Suicide plan	-0.00	.88	**0.16**	**.00**	**0.33**	**.00**
Past-year SA	-0.00	.88	**0.46**	**.00**	**0.18**	**.00**

Significant results bolded
Form of ideation defined as mutually exclusive categories

In sum, around 80% of the times that an adolescent endorsed past-year SI at each wave, parents did not. In the other direction, around 70% of the times that a parent reported SI, the adolescent did not. The agreement on past-year SA was more varied. At wave 1 there was no agreement between parent and adolescents, none of them reported SA when the other one did. In wave 2, 57% of the times than an adolescent reported a past-year SA, parent disagreed; and 50% of the times than a parent reported a SA, the adolescent disagreed. Finally, in wave 3, 90% of the times than the adolescent reported a

SA, the parent did not, and the only SA reported by the parent at wave 3 also was reported by youth.

3. Distribution of past-year SI by age reported by adolescents, parents or either of them at each wave

To have a better picture of the rates of past-year SI reported by each informant, the distribution of SI by age and wave is broken-down in Table 3. Over the 3-year period the highest one-year point prevalence of self-reported SI was at wave 1 when the adolescent was 13 years old (19.5%), and of parent-reported SI was also at wave 1 when the adolescent was 11 years old (13.9%%). At wave 2, the highest one-year point prevalence of self-reported and parent-reported SI was at the age of 14 (14% and 8.2%, respectively). At wave 3, the highest prevalence of SI was at the age of 15 on both adolescent (10.7%) and parent (6.5%) reports. Based on either, adolescent and/or parent report, the highest one-year SI rate was at the age of 12 at wave 1 (26%).

Table 3. Distribution of past-year SI by age reported by adolescents, parents or either by wave

Wave 1				Wave 2				Wave 3			
	Adoles.	**Parent**	**Either**		**Adoles.**	**Parent**	**Either**		**Adoles.**	**Parent**	**Either**
Age (N)	N (%)	N (%)	N (%)	**Age (N)**	N (%)	N (%)	N (%)	**Age (N)**	N (%)	N (%)	N (%)
10 (322)	49 (15.4)	33 (10.3)	76 (23.6)	**11 (302)**	20 (6.7)	22 (7.7)	39 (12.9)	**12 (304)**	14 (4.7)	18 (5.9)	30 (9.9)
11 (297)	45 (15.3)	41 (13.9)	77 (25.9)	**12 (282)**	26 (9.3)	15 (5.3)	38 (13.5)	**13 (267)**	17 (6.4)	13 (4.9)	25 (9.4)
12 (289)	52 (18.1)	31 (10.7)	75 (26.0)	**13 (256)**	32 (12.5)	18 (7.1)	42 (16.4)	**14 (253)**	23 (9.2)	10 (4.0)	31 (12.3)
13 (274)	53 (19.5)	25 (9.1)	64 (23.4)	**14 (245)**	**34 (14.0)**	20 (8.2)	44 (18.0)	**15 (219)**	23 (10.7)	14 (6.5)	32 (14.6)
+14 (39)	7 (17.9)	1 (2.6)	7 (17.9)	**+15 (36)**	4 (11.1)	1 (2.8)	5 (13.9)	**+16 (30)**	3 (10.0)	1 (3.3)	3 (10.0)

Significant results bolded
+p < .1; *p < .05; **p < .01; ***p < .001

Only in wave 2, self-reported SI at the age of 14 was significantly higher than at the age of 11 or less ($X^2 = 9.53$, p = .0049). In wave 1 we did not find differences by age

in the rates of past-year SI reported by adolescents (X^2 = 2.71, p = .61), parents (X^2 = 6.60, p = .16), or any of them (X^2 = 1.89, p = .75); neither in wave 2 in the rates reported by parents (X^2 = 2.76, p = .60) or any of them (X^2 = 3.37; p= .45); and not in wave 3 for adolescent (X^2 = 8.17, p= .08), parent (X^2 = 2.03, p = .73), or either (X^2 = 4.30; p = .37) reports.

4. Continuum of severity: passive ideation, serious ideation, and suicide plans

The distribution by wave of past-year SI, SA, severity forms of ideation, and psychiatric disorders appears in Table 4.

Table 4. Rates of past-year SI and SA, form of ideation, and psychiatric disorders at baseline by wave and at any time.

	Wave 1	Wave 2	Wave 3	Any wave
No suicidal behavior, n (%)	921 (75.4)	951 (84.8)	951 (88.6)	797 (65.3)
Past-year SI, n (%)	299 (24.5)	168 (15.0)	121 (11.3)	422 (34.6)
Form of ideation, n (%)				
No ideation	922 (75.5)	953 (88.7)	952 (88.7)	…
Passive ideation	240 (19.7)	132 (11.8)	93 (8.7)	…
Serious ideation	44 (3.6)	25 (2.0)	18 (1.7)	…
Suicide plan	15 (1.2)	11 (1.0)	10 (0.9)	…
Past-year SA, n (%)	11 (0.9)	10 (0.8)	10 (0.8)	27 (2.2)
Psychiatric disorders (wave 1), n (%)				
Mood	65 (5.4)	36 (3.2)	33 (3.1)	108 (8.9)
Anxiety	179 (14.7)	99 (8.9)	67 (6.4)	275 (22.5)
DBD	111 (9.1)	90 (8.0)	80 (7.5)	177 (14.5)

Combined report parent and/or adolescent except for disruptive behavior disorders (DBD)

Passive ideation was the most frequent form of ideation, with rates ranging between 8.7% and 19.7%, while suicide plan was the least frequent one (range: 0.9-1.2). As can be seen in the last column of the Table 4, the 12-month prevalence of SI at any wave was 34.6% (n = 422) and of past-year SA was 2.2% (n = 27). Around 65% of the adolescents did not report any ideation or made a SA.

The frequency of the suicidality items decreased over time, although the opposite was expected. This phenomenon has been previously reported in other studies with a repeated measures design (See Discussion section).

5. Incidence, persistence and transition between the forms of ideation

Of the total sample of early adolescents, 291 (23.8%) reported past-year SI only at one wave, 96 (7.9%) at 2 waves, and 35 (2.9%) at the three waves. In other words, of the 422 teens who reported suicidal ideation at any wave, 31% reported ideation at least twice.

The rates of incidence, persistence, and transition among each form of ideation are described in Table 5. We found that 123 (14.3%) of the adolescents with no ideation at wave 1 (n = 922) reported some form of ideation at the follow-up (waves 2 and/or 3) (*incidence of ideation*), with passive ideation the most common form of ideation reported (n = 102, 11.9%). Of the 299 adolescents who reported any form of ideation at wave 1, 110 (39%; 9.6% of the total sample) reported any form of ideation at follow-up (*persistence of ideation*), and of those 110, 74 (67.3%) reported the same form of ideation at follow-up. Of the 288 adolescents who reported passive or serious ideation at wave 1, 22 (8.2%) transitioned to a more severe form of ideation (*transition of ideation*).

A logistic regression analysis showed that those adolescents who thought about ideation at wave 1 had over 3 times higher odds of reporting ideation at follow-up, compared to those without ideation at wave 1 (OR, 3.20; 95% confidence interval [CI], 2.31-4.42), after controlling for site, gender, age, the CRI, and any psychiatric disorders.

Considering form of ideation, most of the adolescents with passive ideation at wave 1 (n = 240) did not report ideation at follow-up (66.4%), 26.6% of them reported passive ideation, and 16 (7%) transitioned to a more severe form of ideation (4.8% to

serious ideation and 2.2% to suicide plan). Six (15%) adolescents with serious ideation at baseline (n = 44) transitioned to suicide plan, and 22 (57.0%) reported any other form of ideation (27.5% passive ideation and 27.5% serious ideation) at follow-up. Suicide plan was the form of ideation less frequently reported at baseline (n = 15) and follow-up (n = 19). At follow-up, of those with a suicide plan at wave 1, 23.1% reported passive ideation, none of them had serious ideation, and 2 (15.4%) reported having a plan to kill themselves at follow-up.

Table 5. Cross-tabulation of forms of ideation from wave 1 to waves 2 and/or 3

		Waves 2 and/or 3				
		No ideation	Passive ideation	Serious ideation	Suicide plan	Any ideation
Wave 1	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
No ideation	922 (75.5)	737 (85.7)	102 (11.9)	15 (1.7)	6 (0.7)	123 (14.3)
Passive ideation	240 (19.7)	152 (66.4)	61 (26.6)	11 (4.8)	5 (2.2)	77 (33.6)
Serious ideation	44 (3.6)	12 (30.0)	11 (27.5)	11 (27.5)	6 (15.0)	28 (70.0)
Suicide plan	15 (1.2)	8 (61.5)	3 (23.1)	0 (0.0)	2 (15.4)	5 (38.5)
Active ideation	59 (4.8)	20 (37.7)	14 (26.4)	19 (35.8)		33 (62.3)

Cells in grey indicate persistence of the same form of ideation from wave 1 to waves 2 and/or 3.
Sample size (n = 1,142) at follow-up: No ideation = 860; Passive ideation = 229; Serious ideation = 40; Suicide plan = 13 (any SI at wave 1= 282)
Combined report parent and/or adolescent

In conclusion, at follow-up, 14.3% of the adolescents transitioned from no ideation to any form of ideation. Among ideators at wave 1, 8.2% transitioned to a more severe form of ideation, 26.4% to a less severe form of ideation, and 26.2% showed the same form of ideation at waves 2 and/or 3. Serious ideation had the highest rate of persistence and transition to a more severe form (i.e., suicide plan) in follow-up period.

5.1. Risk factors for the incidence of suicidal ideation

Thinking about suicide seemed to be a risk factor for continuing thinking about suicide or transitioning to a more severe form of ideation at follow-up. We then proceeded to investigate what were the risk factors associated with incidence of ideation by focusing on those early adolescents who did not reported any suicidal behavior at wave 1.

At wave 1, 921 (75.4%) adolescents reported no past-year suicide ideation or had never made an attempt (47.7% girls). Of those, 123 (14.3%) reported any form of ideation at follow-up. The breakdown prevalence by form was: passive ideation (n = 102, 11.9%), serious ideation (n = 15, 1.7%), and suicide plan (n = 6, 0.7%). Three of those adolescents made an attempt (0.3%) at follow-up.

In the multivariate logistic regression model (Table 6, Model 2), among adolescents without any suicidal behavior at wave 1, those who were living in SB and those with anxiety disorders had 2.1 and 2.4 higher odds of starting thinking about suicide at follow-up than their counterparts living in PR or without an anxiety disorder, respectively. Gender and disruptive behavior disorders did not have an independent contribution on the incidence of ideation in the univariate or multivariate models.

Table 6. Association between demographics and psychiatric disorders at wave 1 with incidence of ideation at waves 2 and/or 3 among adolescents without suicidal behavior at wave 1 (N = 921) (Adjusted Logistic Regression Models)

	Waves 2 and/or 3			
	No ideation	Any ideation	Model 1	Model 2
Risk factors - Wave 1	n (%)	n (%)	OR (95% CI)	OR (95% CI)
Site (% SB)	346 (82.2)	75 (17.8)	**2.09 (1.40-3.11)**	**2.10 (1.40-3.16)**
Gender (% girls)	385 (87.7)	54 (12.3)	0.84 (0.57-1.23)	0.83 (0.56-1.24)
Mood	18 (75.0)	6 (25.0)	2.22 (0.86-5.72)	2.22 (0.73-6.73)
Anxiety	63 (73.3)	23 (26.4)	**2.68 (1.59-4.53)**	**2.42 (1.37-4.26)**
DBD	57 (89.1)	7 (10.9)	0.78 (0.35-1.76)	0.52 (0.20-1.32)

Controlling by age and CRI at wave 1
Significant results bolded
"No ideation" as reference category
Combined report parent and/or adolescent except for DBD

Site and gender did not moderate the association between the psychiatric disorders and incidence of ideation (statistics of the interaction in parentheses). That means that anxiety disorder was a risk factor for the incidence of ideation for adolescent of both genders (OR 1.27; 95% CI, 0.42-3.82), and independently from site (OR, 0.42; 96% CI, 0.41-1.22). Living in SB had the same impact on the incidence of ideation for both boys and girls (Interaction OR, 1.56; 95% CI, 0.70-3.48), and independently from the presence or absence of mood disorders (OR, 0.79: 95% CI, 0.11-5.75), or disruptive behavior disorders (OR, 0.98: 95% CI, 0.18-5.33). Lastly, gender did not moderate the association between mood (OR, 1.38: 95% CI, 0.18-10.79) or disruptive behavior disorders (OR, 0.78: 95% CI, 0.12-5.04) with incident ideation in the follow-up period.

Of the 3 adolescents who reported a SA at waves 2 and/or 3, 2 had active ideation (specifically suicide plan), and 1 did not report any form of ideation within the same period.

5.2. Association between the each form of ideation at baseline and follow-up

Table 7 shows the distribution of each form of ideation, passive and active ideation, at follow-up based on the form of ideation, demographics, and psychiatric disorders reported at wave 1.

Table 7. Distribution of passive and active ideation at waves 2 and/or 3 based on the form of ideation, demographics, and psychiatric disorders reported at wave 1.

	W2 and/or W3		
Wave 1	No ideation	Passive ideation	Active ideation
Form of ideation, n (%)			
No ideation	737 (85.7)	102 (11.9)	21 (2.4)
Passive ideation	152 (66.4)	61 (26.6)	16 (7.0)
Active ideation	20 (37.7)	14 (26.4)	19 (35.8)
Demographics, n (%)			
SB	391 (74.8)	99 (18.9)	33 (6.3)
PR	518 (83.7)	78 (12.6)	23 (3.7)
Girls	437 (80.2)	81 (14.9)	27 (5.0)
Boys	472 (79.1)	96 (16.1)	29 (4.9)
Psychiatric disorders (wave 1), n (%)			
No mood	869 (81.4)	153 (14.3)	46 (4.3)
Mood	30 (48.4)	23 (37.1)	9 (14.5)
No anxiety	805 (82.6)	138 (14.2)	31 (3.2)
Anxiety	98 (60.5)	39 (24.1)	25 (15.4)
No DBD	835 (80.5)	162 (15.6)	40 (3.9)
DBD	72 (69.9)	15 (14.6)	16 (15.5)

"Serious ideation" and "Suicide plan" were combined as "Active ideation"
Combined report parent and/or adolescent except for disruptive behavior disorders (DBD)

In the multinomial analyses, in the univaraite models (Table 8, Model 1) all the predictors but gender were associated with passive ideation and active ideation at follow-up. Disruptive behavioral disorders were only significantly associated with future active ideation. Active ideation at wave 1 was the independent predictor with the greater impact on both SI forms at follow-up.

In the multivariate model (Table 8, Model 2) both SI forms, passive ideation and serious ideation, remained significantly associated with future ideation over and above site, gender, psychiatric disorders, and covariates (past-year SA, age, and CRI). Active ideation continued being the strongest predictor of both forms of ideation. Specifically early adolescents with active ideation at wave 1 had almost 4 higher odds of reporting passive ideation and 26 higher odds of reporting active ideation at follow-up compared to those adolescents without active ideation at wave 1.

Adolescents with passive ideation at wave 1 had 2.5 higher odds of reporting passive ideation again and 2.7 higher odds of transitioning to active ideation than their counterparts without passive ideation at wave 1.

Site remained significantly associated with both SI forms at follow-up in the multivariate model. Adolescents living in SB had 1.75 and 2.5 higher odds of reporting passive and active ideation at follow-up than those who were living in in PR, respectively.

Psychiatric disorders related to ideation at follow-up in a different way depending on the form of ideation. In the multivariate model, mood disorders predicted passive ideation and were no longer associated with active ideation, while anxiety and disruptive behavior disorders were only associated with active ideation.

Low rate of SI forms at follow-up limited the power of the study, so the interaction effects had to be interpreted with caution. Specifically (Table 8), living in SB increased the risk of reporting passive ideation and active ideation at follow-up when no active ideation was present at wave 1. Having an anxiety disorder increased the risk of reporting active ideation when no passive ideation was present at wave 1. In contrast, being a female increased the risk of endorsing active ideation when they also endorsed passive ideation at

wave 1. Finally, having a disruptive behavior disorder increased the risk of having passive ideation at follow-up when active ideation was present at wave 1. These interaction effects need further replication.

These interactions were coherent with previous findings, supporting the effect of living in SB and having an anxiety disorder on the incidence of ideation.

Table 8. Estimates from multinomial regression predicting persistence and transition of the form of ideation at waves 2 and/or 3 as function of the form of ideation, site, gender, and psychiatric disorders at wave 1.

	Waves 2 and/or W3			
	Model 1		**Model 2**	
Wave 1	Passive ideation	Active ideation	Passive ideation	Active ideation
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Passive ideation	**2.91 (2.03-4.19)**	**3.71 (1.89-7.28)**	**2.55 (1.74-3.74)**	**2.69 (1.31-5.50)**
Active ideation	**5.02 (2.33-10.83)**	**36.30 (16.27-80.99)**	**3.94 (1.76-8.85)**	**26.05 (10.83-62.68)**
Site (% SB)	**1.62 (1.16-2.52)**	**1.85 (1.05-3.24)**	**1.73 (1.22-2.45)**	**2.46 (1.30-4.65)**
Gender (% Girls)	0.90 (0.65-1.25)	0.98 (0.57-1.65)	0.87 (0.62-1.22)	1.07 (0.57-2.00)
Mood	**4.08 (2.28-7.30)**	**5.00 (2.16-11.53)**	**3.14 (1.56-6.34)**	0.08 (0.28-2.44)
Anxiety	**2.30 (1.51-3.48)**	**6.46 (3.64-11.46)**	1.42 (0.88-2.28)	**3.76 (1.92-7.40)**
DBD	1.09 (0.61-1.96)	**4.86 (2.58-9.15)**	0.64 (0.33-1.24)	**2.58 (2.16-5.73)**
Passive ideation				
Passive x Site	…	…	0.88 (0.42-1.84)	1.08 (0.25-4.66)
Passive x Gender	…	…	0.83 (0.40-1.72)	**5.56 (1.13-27.40)**
Passive x Mood	…	…	1.49 (0.37-6.04)	0.76 (0.04-15.26)
Passive x Anxiety	…	…	0.74 (0.30-1.87)	**0.19 (0.05-0.79)**
Passive x DBD	…	…	3.50 (0.72-17.09)	2.18 (0.39-12.27)
Active ideation				
Active x Site	…	…	**0.06 (0.01-0.33)**	**0.15 (0.03-0.81)**
Active x Gender	…	…	0.65 (0.14-2.89)	0.48 (0.09-2.60)
Active x Mood	…	…	4.25 (0.60-30.18)	3.03 (0.21-43.39)
Active x Anxiety	…	…	1.32 (0.26-6.64)	0.22 (0.04-1.16)
Active x DBD	…	…	**13.71 (1.72-109.25)**	1.28 (0.17-9.51)

'No ideation' was the reference group for passive ideation and active ideation in the multinomial analyses. Combined report except for DBD
Controlling for age, RCI, and past-year SA (wave 1) Significant results bolded

6. Preliminary analyses on suicide attempts

Mirroring Tables 3 for past-year SI, Table 9 shows the distribution of past-year SA by age at each wave based on adolescent, parent, and combined report (either parent and/or adolescent). The overall highest one-year point prevalence of self-reported SA was at wave 1 when the adolescent was 14 or over (2.6%), and of parent report of SA was at the adolescent's age of 14 years (1.6%%) at wave 2. Based on the combined report, adolescent and/or parent, the highest SA rate was at the age of 12 at wave 1 (2.6%).

Table 9. Distribution of past-year SA by age reported by adolescents, parents or either by wave

Wave 1				Wave 2				Wave 3			
	Adoles.	**Parent**	**Either**		**Adoles.**	**Parent**	**Either**		**Adoles.**	**Parent**	**Either**
Age (N)	N (%)	N (%)	N (%)	**Age (N)**	N (%)	N (%)	N (%)	**Age (N)**	N (%)	N (%)	N (%)
10 (322)	1 (0.3)	1 (0.3)	2 (0.6)	**11 (302)**	0 (0.0)	1 (0.3)	1 (0.3)	**12 (304)**	1 (0.3)	0 (0.0)	1 (0.3)
11 (297)	0 (0.0)	1 (0.3)	1 (0.3)	**12 (282)**	2 (0.7)	1 (0.4)	2 (0.7)	**13 (267)**	2 (0.8)	0 (0.0)	2 (0.7)
12 (289)	2 (0.7)	1 (0.3)	3 (1.0)	**13 (256)**	1 (0.4)	0 (0.0)	1 (0.4)	**14 (253)**	3 (1.2)	1 (0.4)	3 (1.2)
13 (274)	3 (1.1)	1 (0.4)	4 (1.5)	**14 (245)**	4 (1.6)	4 (1.6)	6 (2.4)	**15 (219)**	4 (1.9)	0 (0.0)	4 (1.8)
14 (39)	1 (2.6)	0 (0.0)	1 (2.6)	**15 (36)**	0 (0.0)	0 (0.0)	0 (0.0)	**16 (30)**	0 (0.0)	0 (0.0)	0 (0.0)

+p < .1; *p < .05; **p < .01; ***p < .001

In wave 1 we did not find differences by age in the rates of SA reported by adolescents (X^2 = 6.16, p = .19), parent (X^2 = 0.15, p = .99), or any of them (X^2 = 3.57, p = .47); neither in wave 2 in the rates reported by adolescents (X^2 = 6.42, p = .17), parents (X^2 = 7.50, p = .11), or any of them (X^2 = 8.95, p = .06); nor in wave 3 for adolescent (X^2 = 3.66, p = .45), parent (X^2 = 3.22, p = .52), or combined (X^2 = 3.65, p = .45) reports of SI.

Combining parent and/or adolescent report, over the 3 years, 27 early adolescents made at least one SA (31 SAs in total). Eleven (0.9%) SAs were made at wave 1, 10 (0.9%) at wave 2, and 10 (0.9%) at wave 3. A total of 24 adolescents made only 1 SA over time, 19 (79.2%) girls and 5 (20.8%) boys (X^2 = 9.30; p = .00); and 16 (66.7%) were

living in SB and 8 (33.3%) in PR (X^2 = 3.85, p = .05). Lastly, 3 adolescents made two or more SAs, one boy from SB made a SA at each wave (from SB), and two girls made 2 SAs (1 from SB and 1 from PR).

In relation to the same-year SI, suicide plan (n = 14) and serious ideation (n = 9) were the most frequency concurrent (within the same year of the SA) SI forms, followed by passive ideation (n = 4) and no ideation (n = 4).

For the trajectories of ideation, we focused on those adolescents who made at last one SA at waves 2 (n =10) or 3 (n =9). Ten cases made a SA from w1 → w2 and 9 from w2 → w3 (n=10, data on ideation at w2 from in one case is missing). In these waves, 11 (57.9%) out of the 19 cases there was a transition for a less to a more severe form of SI. In one case the form of ideation was the same from one wave to the next one. In 2 cases (10.5%), the attempter did not report any ideation in the same or previous year. In one case (5.2%) the transition was from ideation to no ideation. In 4 cases (21%), a previous SA preceded the SA (same case W1 → W2 and W2 → W3).

Of the 15 cases that made only one SA at waves 2 or 3, 10 (66.7%) reported SI the year before of making the SA. In sum, attempters were characterized by a high rate of persistent SI (same form or different form of SI compared to previous and concurrent wave of the SA).

7. Additional analyses

The following results were part of two symposia presented at the Latina Researchers Conference in New York in April 2014, and APA Annual Convention in Washington in August 2014. In the present section we only display the results related to ideation.

Aims

1. Explore whether there are differences by site - that is, living in the SB (minority group) vs. living in PR – and gender in the distribution of suicidal ideation.
2. Explore the association between suicidal ideation and psychiatric disorders.
3. Investigate whether site or gender moderate the association between suicidal ideation and psychiatric disorders.

Method

Sample

To maximize the sample size, we aggregated the data across waves, which means that from the 1,221 adolescents at wave 1, the 1,121 and 1,073 adolescents at waves 2 and 3, we obtained 3,663 records (1719 from SB; 1944 from PR). Broken down by age, 356 records were for subjects aged 10 years; 618, 11 years; 822, 12 years; 797, 13 years; 532, 14 years; 256, 15 years; and 34, 16 years. Fifty adolescents with history of SA at wave 1 were excluded from the analyses.

Measures

Same as described before (review Study 1 Methods)

Data analyses

Phi coefficient was used to ascertain the strength of the association between passive ideation, serious ideation, suicide plan, and suicide attempts as independent categories. The rates of past-year SI by demographic, psychiatric diagnoses and past-year SA were compared using two-tailed X^2 tests.

We used Generalized Estimating Equation (GEE) models to explore the association between suicidal ideation and site, gender, and psychiatric disorders, controlling for age, past-year SA, and cumulative risk index. In Model 1 each predictor was entered independently plus the covariates. In Model 2 all the predictors were entered simultaneously.

Results

Over the 3-year assessment, the rates of passive ideation ranged from 10.5% to 23.1%, serious ideation ranged from 2.6% to 4.8%, suicide plan from 0.9% to 1.2%, and SA from 0.8% to 0.9%.

The one-year overlap among suicidal behaviors was substantial (Table 1). All 4 suicidality items were therefore strongly related. The association between each form of ideation and SA became stronger with the increase in severity of the form of ideation.

Table 1. One-year overlap among passive ideation, serious ideation, suicide plans, and SA

	Phi Coefficient* (%)			
	Passive ideation	Serious ideation	Suicide plan	Suicide attempt
Passive ideation	…	.29 (15.8)	.17 (5.1)	.16 (4.3)
Serious ideation	.29 (70.7)	…	.53 (29.3)	.36 (18.7)
Suicide plan	.17 (77.8)	.53 (100)	…	.41 (38.9)
Suicide attempt	.16 (77.4)	.36 (74.2)	.41 (45.2)	…

For these analyses we used number of record (n = 3,663)
Ellipses indicate that an association was not estimated
* p < .001 for all phi coefficients

Suicidal ideation at any wave was present in 588 (17.2%) records. Children living in SB reported higher rates of ideation compared to children living in PR (19.9% vs. 14.9, X^2 = 14.97; p = .00). Similarly teens with a psychiatric disorder also had more ideation compared to their counterparts without psychiatric disorders - mood disorder vs. no (60.4% vs. 15.6%, X^2 = 180.93; p = .00), anxiety disorder vs. no (44.6% vs. 14.2%, X^2 = 200.75; p = .00), and disruptive behavior disorder vs. no (33.8% vs. 15.7% vs. X^2 = 59.03; p = .00). Girls (17.9%) and boys (16.6%) had similar rates of ideation (X^2 = 1.14; p = .28).

The results of the univariate and multivariate GEE models exploring the association between suicidal ideation and site, gender, and psychiatric disorders are showed in Table 3. Last year SA, age and cumulative risk were entered as covariates.

In the multivariate model (Model 2), adolescents living in SB had 1.51 higher odds of endorsing ideation at any wave than those living in PR. The three diagnostic groups were associated with SI. Specifically those with any mood, anxiety or disruptive disorders had respectively 4.2, 3.5 and 1.6 higher odds to report SI at any wave compared to those without a psychiatric disorder.

Table 3. Univariate and multivariate Odds of last year SI (waves 1, 2 and 3) associated with site, gender, and psychiatric disorders (Results of GEE models)

	Model 1 OR (95% CI)	Model 2 OR (95% CI)
Site (SB)	**1.39 (1.11-1.73)**	**1.49 (1.18-1.86)**
Gender (Girl)	0.35 (0.89-1.37)	1.14 (0.91-1.42)
Mood	**8.20 (5.55-12.13)**	**3.94 (2.50-6.20)**
Anxiety	**4.83 (3.75-6.20)**	**3.45 (2.62-4.53)**
DBD	**2.73 (2.01-3.72)**	**1.59 (1.12-2.27)**
Interaction effects:		
Mood x Site	…	0.48 (0.19-120)
Mood x Gender	…	0.65 (0.27-1.57)
Anxiety x Site	…	**0.45 (0.26-0.76)**
Anxiety x Gender	…	0.68 (0.40-1.61)
DBD x Site	…	0.59 (3.00-1.17)
DBD x Gender	…	0.79 (0.38-1.63)
Gender x Site	…	1.29 (0.84-2.00)

NOTE: controlling for age, cumulative risk and past-year SA
Significant results bolded
DBD = Disruptive Behavior Disorder

Gender did not moderate the relationship between psychiatric disorders and suicidal ideation. There interaction between anxiety disorders and site was statistically significant. Specifically, among those teens living in PR, the association between anxiety disorders and ideation was stronger (X^2 = 180.83, p = .00) compared to teens living in SB (X^2 = 45.54, p = .00) (Figure 1).

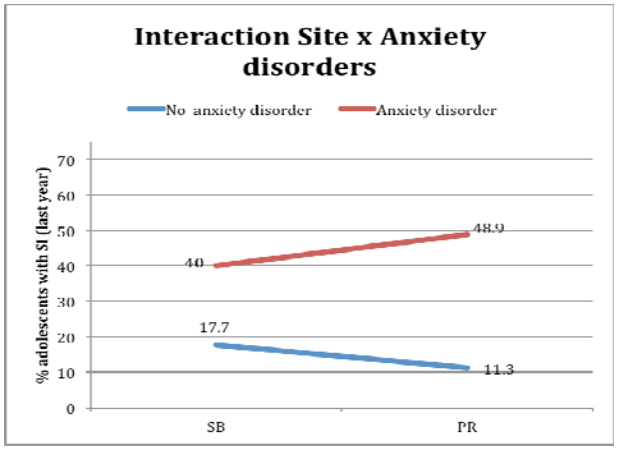


Figure 1. Interaction effect of site and anxiety disorders in suicidal ideation

(Note: Upper line 'Anxiety disorder"; Lower line "No anxiety disorder')

Study 2

Characteristics of Suicidal Ideation that Predict the Transition to Future Suicide Attempts in Adolescents

Methods Study 2

1. Research methodology and study design

The purpose of this study was to develop a brief, self-report instrument to assess the most important risk factors for suicide (Shaffer, Gould, et al., 1996) and to validate it against a diagnostic profile of suicide risk assessed with a well-validated structured interview. Additional goals were to measure test–retest reliability and to compare the instrument (the Columbia SuicideScreen® [CSS]) with the Beck Depression Inventory (BDI), an extensively used depression screening instrument (Shaffer et al., 2004).

1.1. Study procedures

Eight schools, with a population of 2,858 students in grades 9 through 12, were chosen to represent the different types of schools in the New York City metropolitan area. These included two parochial single-sex schools (one male and one female), two suburban and six urban schools, and one vocational-technical school.

1.2. Baseline and follow-up assessments

Finally, 1,729 (67%) agreed to participate and were present on the screening day, completed the Columbia Suicide Screening (CSS) questionnaire and the Beck Depression Inventory (BDI) embedded in a larger health survey, at the start of a regular class period during 1991 and 1994. The final sample was 57% female, with a mean age of 15.4 (SD = 1.4); age range was 11 to 21 years. Of the final sample, 56% was white, 18% African American, 13% Latino, and 13% of other ethnicity. Each grade represented approximately 25% of the sample.

Of the 489 students who screened positive in the CSS, 356 (73%) were interviewed on the DISC 2.3. Using sampling with replacement, 285 students who screened negative on the CSS were group matched by grade, gender, and ethnicity to the CSS-positive sample and were selected to serve as controls.

Four to six years later, 552 out of the 641 adolescents who completed both the CSS and DISC 2.3. at baseline provided follow-up data. As part of the follow-up assessment, we re-administered an adapted version of the ASI by telephone or in person to assess whether they had made a suicide attempt since the original interview.

The NYS Psychiatric Institute's institutional review board (IRB), the review board of the New York City Board of Education, and the review board of the Archdiocese of New York approved the consent forms and screening materials. Further information about the study design and methodology has been detailed elsewhere (Shaffer et a., 2004).

2. Present study

The present study has two parts, we specify which samples, measures, and analyses are used for Part 1[1] and Part 2.

2.1. Sample

Sample (Part 1)

Participants were 506 adolescents out of the original 641, ages 12-21 (M = 15.6, SD = 1.4) who took part in a two-stage screening and who also provided data as part of a 4-6-year follow-up study. The final sample was 61% female, with a mean age of 15.6 (SD = 1.4); age range was 11 to 21 years. Of the final sample, 44% was white, 25% African American, 18% Latino, and 7% Asian and 5% of other ethnicity.

Adolescents were contacted by telephone 4-6 years later (M = 5.1, SD = 1.0) and after providing informed consent (or parental consent with child assent for minors), they took part on an interview in which they were asked whether they had made a SA since the baseline interview. Five hundred and six (79%) individuals from the larger sample of 641 adolescents provided this information. Forty-six additional adolescents took part in the follow-up study (n = 552) but did not provide information about their SAs.

Of these 506 adolescents, 163 individuals had reported SI at baseline – 149 on the CSS (assessed for the previous 3 months) and an additional 14 on the C-DISC (assessed for the previous 6 months), and 122 of these 163 adolescents had also completed the ASI-SI at baseline. Final sample selection is depicted in Figure 1. There were no statistically

[1] Extended version of Methods extracted from: *Miranda R., **Ortin A**., Scott M., Shaffer D. (2014). Characteristics of suicidal ideation that predict the transition to future suicide attempts in adolescents. Journal of Child Psychology and Psychiatry, Vol. 55(11), p. 1288–1296 (Appendix)*

significant differences in age, sex, race/ethnicity, or diagnosis among participants who did and did not take part in the follow up.

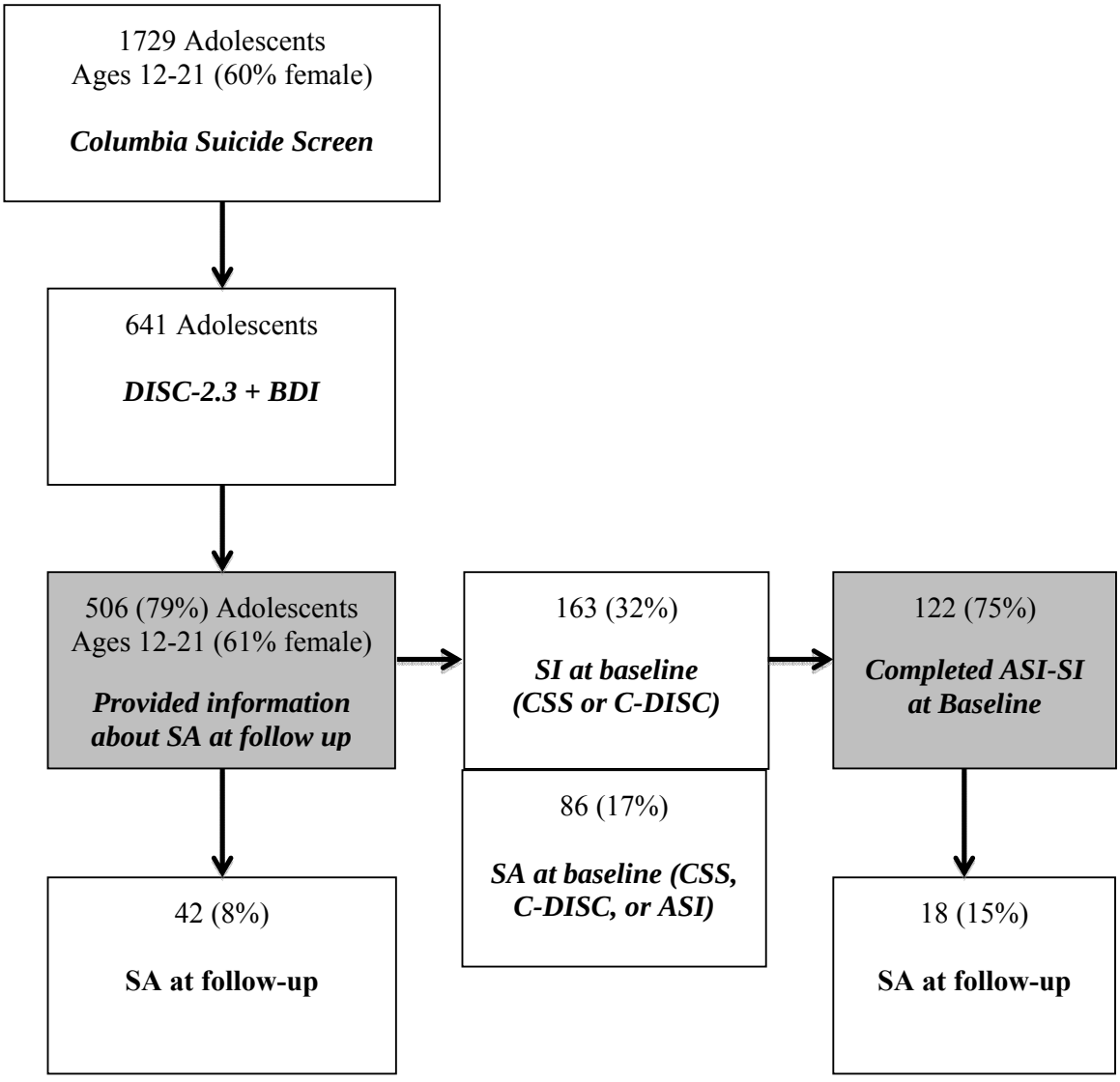


Figure 1. Sample selection. Shaded boxes indicate the final samples included in the analyses (Part 1) *(Extracted from Miranda, Ortin et al. (2014) - Appendix)*

Sample (Part 2)

We examined SI characteristics among adolescents who reported recent SI but no SA history at baseline, and who also completed the ASI-SI module (SI-only). Of the 122 adolescents who reported recent SI at baseline in the CSS or DISC and took part in the 6-4 year follow-up study, 97 (76%) did not have a history of SA at baseline (SI-only). This subsample was 57% females, with a mean age of 15.4 (SD = 1.2). The ethnicity/race distribution of the sample was: 55% white, 16% Black, 11% Latino, 10% Asian, and 8% others.

2.2. Measures

The following measures were administered for Part 1 and Part 2.

- *Demographics*

At baseline and follow-up adolescents provided information about their demographics characteristics including gender, age, and ethnicity/race.

- *Suicide screening questionnaire*

The Columbia Suicide Screen (CSS; Shaffer et al., 2004) is an 11-item, self-report questionnaire that includes items for lifetime suicide attempts and the 3-month prevalence of suicide ideation, negative mood ("unhappy or sad," "withdrawn," "irritable," and "nervous or worried"), and substance abuse ("drugs or alcohol"). To avoid a focus on suicidality, these items are embedded within 32 general health questions and 4 items on relationships and family concerns. Responses are entered on a 5-point, visual analog scale

(Aitken, 1969), with anchor points labeled from 1 ("no problem") to 5 ("very bad problem"). The items assessing suicide ideation and attempt invite only a "yes" or "no" response. Students who endorse a symptom as "bad" or "very bad" (4 or 5) or "yes" to current ideation or prior attempt are then asked contingent questions about the self-perceived need for help and current mental health treatment, if any. The question about self-perceived need for help was asked to identify students who were likely to be more highly motivated. The question about the actual receipt of help was included to avoid post-screening interference with ongoing treatment.

Two suicide-related questions (with "yes" versus "no" response choices) were embedded within a larger, 32-question health survey. The questions were:

1) *"Have you ever tried to kill yourself?"*

2) *"During the past three months, have you thought about killing yourself?"*

Test-retest reliabilities (κ) for these questions were .48 and .58, respectively (Shaffer et al., 2004).

Participants who endorsed recent SI were asked four additional yes/no questions:

1) *"Are you still thinking about killing yourself?"* (currency);

2) *"Have you often thought about killing yourself?"* (frequency);

3) *"Have you thought seriously about killing yourself?"* (seriousness); and

4) *"Have you thought about killing yourself for a long time?"* (duration).

Associations in responses to these 4 questions ranged from V = .40 to .63 in the present sample.

- *Psychiatric diagnoses*

At baseline, the Computerized Diagnostic Interview Schedule for Children, version 2.3 (C-DISC; Shaffer, Fisher, et al., 1996), was administered via computer by lay interviewers to establish psychiatric diagnoses consistent with DSM-III-R criteria. The DISC, version 2.3, is a respondent-based instrument designed to be used by lay interviewers to establish a probable DSMIII-R psychiatric diagnosis in children and youth aged 6 to 17. Respondents are asked an initial broad question about a symptom that, if endorsed, is followed by a series of items rating its severity. Computer algorithms calculate diagnoses as well as scores on symptom and criterion scales. In this study, a youth informant was administered only part of the entire interview (i.e., major depression/dysthymia, alcohol and substance use, and anxiety). The anxiety module included sections for individual anxiety disorders.

The test–retest reliability of the DISC 2.3 for lay- versus clinician- administered DISC was 0.37 (κ) for major depression, 0.43 (κ) for dysthymia, and 0.39 (κ) for any anxiety disorder in a community sample (Schwab-Stone et al., 1996). The validity of the DISC 2.3 when comparing a clinician rating of ambiguous responses to the original DISC rating was 0.79 (κ) for major depression, 0.54 (κ) for dysthymia, and 0.49 (κ) for any anxiety disorder (Schwab-Stone et al., 1996).

Diagnoses assessed at baseline were grouped in higher-order diagnostics groups as follows: mood disorders (Major Depressive Disorder (MDD) or Dysthymic Disorder); anxiety disorders (Panic disorder (PD), Agoraphobia, Social Phobia, Generalized Anxiety Disorder (GAD), or Overanxious Disorder), and substance use disorders (Alcohol Abuse/Dependence, Marijuana Abuse/Dependence, or Other Substance Use/Dependence). The timeframe for these diagnoses was ‘past six months’.

Diagnoses at follow-up were assessed using the C-DISC-IV (Shaffer et al. 2000), a computer-based adaptation of the C-DISC 2.3, administered by lay interviewers. All of the modules reflecting DSM-IV diagnostic criteria, assessed for the previous year, were administered.

Diagnoses assessed at follow up were: mood disorders (MDD, Dysthymic Disorder, or Mania); anxiety disorders (PD, Social Phobia, GAD, Obsessive-Compulsive Disorder, or Posttraumatic Stress Disorder); and substance use disorder (Alcohol Abuse/Dependence, Nicotine Dependence, Marijuana Abuse/Dependence, or other Substance Use/Dependence). Adolescents who meet criteria for at least one of the diagnostic groups were classified as having "Any disorders".

- *Depressive symptoms*

Depressive symptoms were assessed with the *Beck Depression Inventory* (BDI; Beck, Steer, Beck, & Newman, 1993). The BDI contains 21 items that assess cognitive, behavioral, affective, and somatic components of depression. The responses for each question range from 0 (symptom not present) to 3 (symptom is severe). It has demonstrated good reliability and validity for use with adolescents (Roberts, Lewinsohn, & Seeley, 1991; Strober, Green, & Carlson, 1981). The SI question was omitted from total-score calculations, lowering the maximum score to 57. In nonclinical adolescent populations, BDI scores of 16 and above indicate possible dysphoria, scores greater than 21 indicate presumptive clinical depression (Kendall, Hollon, Beck, Hammen, & Ingram, 1987). Cronbach's alpha for the BDI was .88 in the present study.

- *Adolescent Suicide Interview for Suicide Attempt (ASI-SA).*

The Adolescent Suicide Interview, SA Module (ASI-SA) is a semi-structured interview designed by Shaffer and colleagues to obtain information about the total number of suicide attempts that an adolescent has made and the circumstances surrounding the adolescent's most recent attempt (Shaffer, Gould, Fisher, & Trauman, 1990). It consists of a standard glossary of terms and rating scales with descriptive anchor points. The probes used to obtain the information and the order in which questions are posed are left to the interviewer. Respondents were asked an initial probe question (e.g., *I want to ask you about the last time you tried to kill yourself. Can you tell me what you actually did?*), and, when they had completed that account, they were asked additional questions to complete the rating scale attached to 36 questions covering characteristics of suicide attempts, including method, warnings provided before the attempt, length of planning, preparatory behavior, isolation, timing of the attempt, wish to die, and feelings after the attempt.

SAs during follow-up, which were assessed blind to baseline attempt history, were determined via a modified version of the ASI-SA, that began by inquiring about lifetime suicide attempt history (*In your whole life, have you ever tried to kill yourself?*), the participants' most recent suicide attempt (*When was your last attempt?*), and whether the most recent attempt occurred after the screening (*Was that after the first survey we did?*).

Individuals who reported that any SA occurred after baseline were classified as having made a SA during the follow-up period (Miranda et al., 2014). These adolescents were also asked about the number of attempts since baseline, age at their last attempt, and to elaborate around the characteristics of the SA (i.e., method, precipitant events, intentionality, etc.). The time between baseline and the SA was determined by subtracting the participant's age at baseline from their age at their most recent follow-up attempt.

The agreement between SA history, as reported on either the ASI or CSS at baseline, and SA history at follow up was substantial, with κ = .69 and .70, respectively (excluding adolescents who reported a first-time SA at follow up that occurred after the baseline interview).

Agreement in endorsement of a lifetime suicide attempt between the ASI and the CSS was high (κ = .77; p < .01). Agreement in endorsement of a lifetime attempt on the ASI between baseline and follow-up was adequate (κ = .56; p < .01).

- *Adolescent Suicide Interview for Suicidal Ideation (ASI-SI)*

The Adolescent Suicide Interview, SA Module (ASI-SA) is a semi-structured interview to assess the characteristics of the adolescents' most recent SI episode. It was developed to complement the ASI for adolescent suicide attempters (Miranda et al., 2008; Shaffer, Gould, Fisher, & Trauman, 1990). This module was also administered as part of the study. Questions were presented in a fixed order, with suggested probes, and fixed interviewer-completed rating scales that focus on the characteristics of the individual's most recent SI episode, including timing of their most recent ideation, frequency of SI, wish to die during their most recent SI, and length of a typical episode of ideation. Questions for which participants did not know an answer were counted as missing data. The ASI-SI was administered by Bachelor's-level research assistants, supervised by a psychiatrist.

Questions assessing the characteristics of the adolescent's most recent SI episode were:

1. **Timing:** *"When was the last time that you thought about suicide?"*

   Part 1: > 2 weeks ago vs. within the past 2 weeks

2. **Frequency**: *"During that period, how often did you think about suicide?"*

   Part 1: > 1 every 2 weeks vs. > 1 per week

   Part 2: Once/3 days vs. once/week vs. once/2 weeks

3. **Intentionality/Wish to die**: *"How serious do you think you were about wanting to die?"*

   Part 1: Did not want to die/Uncertain vs. Wanted to die

   Part 2: Did not want to die vs. Uncertain vs. Wanted to die

4. **Length of typical single ideation during last episode**:

   Part 1: > 1 hour vs. 1 hour or more

   Part 2: <30 min. vs. 31-60 min. vs. 1-23 hrs. vs. >24hrs

5. **Disclosure**: *"Did she/he tell a responsible adult she/he was thinking about suicide?"*

   Part 2: Yes vs. No

6. **Previous warnings/threats**: *"Did you tell anyone you were planning to kill yourself?" "Can you think of anything you said to anyone?*

   Part 2: No vs. Veiled vs. Specific

7. **Current wish to die**: *"Do you want to die now?"*

   Part 2: Do not want to die vs. Uncertain vs. Want to die

8. **Treatment for a mental state associated with most recent ideation:**

   Part 2: Yes vs. No

Not all the ASI-SI questions were used in Part 1 and Part 2, as it is specified before the answers for each one of the questions. The answer options were collapsed in different ways depending on the analyses run for Part 1 and Part 2 of the study, as previously indicated in the text.

2.3. Data Analysis

Part 1:

Two-tailed Chi-square tests (for categorical variables) and t-test (for continuous variables) were run to verify whether the adolescents with and without a suicide attempt at follow up differed in their demographics characteristics, depressive symptom, psychiatric disorders at baseline, and in the CSS suicidal ideation questions about frequency, seriousness, currency, and duration of adolescent's ideation in the last 3 months.

To examine whether each of the baseline CSS ideation questions would predict a future SA (reported at follow-up) among the larger sample of 506 adolescents who provided this information at follow up, separate logistic regression analyses (Model 1) were conducted in which currency, frequency, seriousness, and duration of SI on the CSS were entered as predictors of a future SA, adjusting for gender, presence of a C-DISC mood, anxiety, and substance use diagnosis, and SA history (as reported on the CSS, C-DISC, or ASI at baseline), with covariates included in the model if they differentiated between adolescents who did vs. did not make a SA at follow up at an alpha level of $p < .10$. In addition, all four CSS questions were entered simultaneously into one multivariate analysis (Model 2) to examine whether they predicted a future SA, adjusting for the other covariates.

Data from the 122 participants who completed the ASI-SI and the follow up was also analyzed to explore whether the adolescents with and without a suicide attempt at follow up differed in their demographics characteristics, depressive symptom, psychiatric disorders at baseline, and in the CSS suicidal ideation questions about frequency, seriousness, currency and duration with two-tailed test and t-test.

Logistic regression analyses were run to examine the SI characteristics as predictors of a future SA included timing of the most recent SI, frequency of SI, seriousness of the adolescent's wish to die, and length of the most recent SI episode, with variables dichotomized in a manner consistent with previous research (Miranda et al., 2014). Each characteristic was entered into its own logistic regression (Model 1), adjusting for gender, depressive symptoms, and SA history, and also into a full model (Model 2) that included all characteristics. This model adjusted for depressive symptoms, rather than diagnosis, in order to reduce the number of variables in the model, given the smaller sample size.

Part 2:

Two-tailed chi-square tests and t-tests were run to explore whether the 97 students with SI-only at baseline who attempted for the first-time during the follow-up interval differed from those who did not make any attempt in the demographic characteristics and psychiatric disorders at baseline and follow-up.

The characteristic reported on the ASI-SI was analyzed via multinomial regression to explore its association with persistent SI and transition to SA at follow-up. Each SI characteristic was entered into its own separate regression, adjusting for gender and depressive symptoms. 'No suicidal behavior' at follow-up was the reference category.

Results Study 2

Part 1[2]

1. Suicide attempts made during the follow-up period

No suicide deaths occurred during the study period. Forty-two (8%) out of 506 adolescents endorsed having made a SA during the follow-up period, either through ingestion (n= 23; 55%), use of a cutting instrument (n = 7; 17%), a gun (n = 5; 12%), or other methods (n = 7; 17%).

2. Demographic characteristics at baseline and follow-up

There were no differences by age or ethnicity/race between the adolescents who attempted suicide at follow-up (n = 42) and those who did not make a SA at follow-up (n = 464) (Table 1). More girls than boys attempted suicide at follow-up (74% vs. 26%, p = .07) although the difference was not significant. Attempters met more criteria for mood (33% vs. 12%, p = .00), anxiety (31% vs. 15%, p = .01), and substance use disorders (12% vs. 5%, p = .05). Lastly, they reported greater severity in the depressive symptoms at baseline on the BDI (10.5 (8.7) vs. 16.4 (9.9), p = .00).

[2] Extended version of Results extracted from: *Miranda R., **Ortin** A., Scott M., Shaffer D. (2014). Characteristics of suicidal ideation that predict the transition to future suicide attempts in adolescents. Journal of Child Psychology and Psychiatry, Vol. 55(11), p. 1288–1296 (Appendix)*

Table 1. Baseline demographics and psychiatric diagnoses of adolescents who took part in the follow up

	Baseline	Follow Up			
Baseline	All (n = 506)	No SA (n = 464)	SA (n = 48)	χ^2 or t	p
Age, M (SD)	15.6 (1.4)	15.6 (1.4)	15.6 (1.4)	0.15	.88
BDI Score, M (SD)	10.9 (8.9)	10.5 (8.7)	16.4 (9.9)	3.95	.00
Sex, n (%)					
Female	307 (61)	276 (59)	31 (74)	3.31	.07
Male	199 (39)	188 (41)	11 (26)		
Race/Ethnicity, n (%)					
White	219 (44)	207 (46)	12 (29)	5.16	.27
Black	126 (25)	113 (25)	13 (31)		
Latino	88 (18)	77 (17)	11 (26)		
Asian	35 (7)	32 (7)	3 (7)		
Other	27 (5)	24 (5)	3 (7)		
C-DISC Diagnosis (past 6 months), n (%)					
Mood	66 (13)	53 (12)	13 (33)	14.41	.00
Anxiety	71 (16)	60 (15)	11 (31)	6.78	.01
Substance Use	27 (5)	22 (5)	5 (12)	3.92	.05

3. Baseline suicidal ideation and suicide attempt history

At baseline, 149 (29%) out of 506 participants reported recent (previous 3 months) SI on the CSS, and 75 (15%) participants reported a lifetime SA history: 61 on the CSS, 65 on the C-DISC, and 63 on the ASI (Table 2). There were 11 additional adolescents who did not report a SA at baseline but at follow-up said that their SA occurred prior to baseline. This information was verified by comparing their age at baseline to the age when they reported having made their most recent SA at follow up. These adolescents were thus also classified as having a lifetime SA history at baseline, for a total of 86 (17%) of adolescents with a lifetime SA history at baseline.

Of those adolescents who reported recent SI (n = 149), 43 (9%) participants reported that they were still thinking about suicide (currency), 105 (21%) reported that they had often thought about killing themselves (frequency), 76 (15%) reported that they had thought seriously about killing themselves (seriousness), and 65 (13%) reported that they had thought about killing themselves for a long time (duration).

Table 2. Responses to the CSS suicidal ideation questions and SA history

	Baseline	Follow up			
Baseline	All (N = 506)	No SA (N =464)	SA (N = 42)	χ^2	p
Suicidal Ideation, past 3 months (CSS), n (%)					
Thought about killing yourself?	149 (29)	123 (27)	26 (62)	23.23	.00
If yes, then:					
Still thinking about killing yourself?	43 (8)	37 (8)	6 (14)	1.97	.16
Often thought about killing yourself	105 (21)	82 (18)	23 (55)	32.22	.00
Thought seriously about killing yourself?	76 (15)	57 (12)	19 (45)	32.77	.00
Thought about killing yourself for a long time?	65 (13)	50 (11)	15 (36)	21.39	.00
Suicide Attempt History[a], n (%) (CSS, C-DISC, or ASI)	86 (17)	65 (14)	21 (50)	35.36	.00

[a] Includes 11 adolescents who reported no suicide attempt history at baseline but who reported, at follow up, having made a lifetime attempt that occurred prior to the baseline assessment, and whose reported age of their most recent attempt fell before or at their age at baseline.

At follow-up, the 42 adolescents who made a SA since baseline reported more recent SI and SA history at baseline than those who did not attempt. They also reported that during their most recent episode of SI at baseline they thought about SI more frequently, Their thought were more serious, and lasted for a long time.

4. CSS questions on SI at baseline that predicted a SA 4-6 years later

Endorsement of recent SI (vs. not) in the previous 3 months at baseline was associated with 2.6 times higher odds of a future SA (95% *C.I.* = 1.3-5.5; $p < .01$), adjusting for sex, diagnosis, and previous SA history.

In the separate regression analyses (Table 3, Model 1), frequency and seriousness of ideation were associated with about 3 times higher odds of reporting a future SA ($p < .05$) controlling for sex, diagnosis, and SA history. Those who thought about killing themselves for a long time (duration) were more than 2 times more likely to make a SA at follow-up. Currency was not associated with future SA.

In a multivariate model (Model 2) that included all CSS SI questions as predictors of a future SA, only frequency of SI was associated with increased risk of a future SA (*OR* = 3.6, 95% *C.I.* = 1.4-9.1; $p < .01$), while currency (*OR* = 0.2, 95% *C.I.* = 0.1-0.8; $p < .05$) was associated with decreased risk of a future SA. Gender and psychiatric disorder were not associated with future SA. Adolescents with a history of SA at baseline were almost 4 times more likely to attempt at follow-up than those without a history of SA.

Table 3. Responses to CSS suicidal ideation questions at baseline as predictors of a suicide attempt at follow-up (n = 506)

Baseline	Model 1[a] OR (95% CI)	Model 2 OR (95% CI)
Sex	…	1.3 (0.6-2.9)
Diagnosis		
Mood	…	1.6 (0.7-4.0)
Anxiety	…	1.2 (0.5-3.2)
Substance	…	1.2 (0.3-4.0)
Suicide Attempt History	…	3.8** (1.7-8.3)
Columbia Suicide Screen Ideation (CSS) Questions		
Are you still thinking about killing yourself?	0.6 (0.2-1.9)	0.2* (0.1-0.8)
Have you often thought about killing yourself?	3.5** (1.7-7.2)	3.6** (1.4-9.1)
Have you thought seriously about killing yourself?	3.1** (1.4-6.7)	2.5+ (0.9-6.5)
Have you thought about killing yourself for a long time?	2.3* (1.1-5.2)	0.8 (0.3-2.2)

[a] Each suicidal ideation characteristic entered into its own logistic regression, adjusting for sex, diagnosis, and suicide attempt history at baseline
… Indicates different values for each regression.
+ $p < .10$; * $p < .05$: ** $p < .01$

5. Suicide attempts made during the follow-up period among adolescents ideators at baseline

Of the 506 students, 122 who reported recent suicide ideation on the CSS or the DISC 2.3 also completed the ASI-SI at baseline. During the follow-up period, 15% (n = 18) of adolescents made a SA (11 through ingestion, 3 with a gun, 2 through cutting, 1 through attempted hanging, and 1 through a combination of ingestion and cutting).

6. Demographics characteristics among adolescent ideators interviewed at baseline and follow-up

There were no significant differences by age, gender, or race/ethnicity among individuals who did or did not endorse a SA at follow up (Table 4). Those who had attempted at follow-up showed a tendency to score higher in depression severity at baseline (p = .08) and to have more anxiety (p = .08) and substance use (p = .05) disorders than those who did not attempt at follow-up.

Table 4. Baseline Characteristics of ASI-SI completers who took part in the follow up

	Baseline	Follow Up			
Baseline	All (n = 122)	No SA (n =104)	SA (n = 18)	χ^2 or t	*p*
Age, M (SD)	15.5 (1.3)	15.5 (1.3)	15.4 (1.4)	0.06	.95
BDI Score, M (SD)	16.6 (9.8)	15.9 (9.8)	20.3 (9.0)	1.78	.08
Sex, n (%)					
Female	73 (60)	62 (60)	7 (39)	0.01	.90
Male	49 (40)	42 (40)	11 (61)		
Race/Ethnicity, n (%)					
White	66 (54)	56 (54)	10 (56)	4.73	.32
Black	18 (15)	17 (16)	1 (6)		
Latino	18 (15)	16 (15)	2 (11)		
Asian	12 (10)	10 (10)	2 (11)		
Other	8 (7)	5 (5)	3 (17)		
C-DISC Diagnosis (past 6 months), n (%)					
Mood	30 (25)	24 (24)	6 (35)	1.02	.31
Anxiety	30 (25)	23 (27)	7 (50)	3.10	.08
Substance Use	16 (13)	11 (11)	5 (28)	3.74	.05

7. Distribution of the characteristics of suicidal ideation among adolescent ideators at baseline

With regard to the characteristics of the SI reported on the ASI-SI (Table 5), 21% percent of adolescents (n = 25 out of 119 who provided responses) reported that their most recent SI occurred within the previous 2 weeks, while the majority of adolescents (79%; n = 94) reported their SI occurred more than 2 weeks before inquiry. Fifty-three percent (n = 54 out of 101 who provided responses) of adolescents reported an ideation frequency of more than once per week. Most adolescents reported that they did not want to die or were uncertain about wanting to die during their most recent ideation episode (n = 93 out of 121 who provided responses; 77%), with 23% (n = 28) reporting they wanted to die. Seventy-two percent of adolescents reported that the typical length of their most recent SI was less than 1 hour (n = 85 out of 118 who provided responses), while 28% (n = 33) reported SI that lasted an hour or longer. Lastly, 33% reported SA history at baseline.

Table 5. Characteristics of suicidal ideation and SA history among ideators

Baseline	Baseline	Follow-up			
	All (n = 122)	No SA (n = 104)	SA (n = 18)	χ^2	*p*
Characteristics of Most Recent SI (ASI-SI), n (%)					
Timing of most recent SI (n = 119)					
> 2 weeks ago[b]	94 (79)	80 (79)	14 (78)	0.02	.89
Within past 2 weeks	25 (21)	21 (21)	4 (22)		
Frequency of ideation (n = 101)					
> 1 every 2 weeks[b]	47 (47)	42 (49)	5 (31)	1.79	.18
> 1 per week	54 (53)	43 (51)	11 (69)		
Wish to die (n = 121)					
Did not want to die/uncertain[b]	93 (77)	82 (80)	11 (61)	2.95	.09
Wanted to die	28 (23)	21 (20)	7 (39)		
Length of typical single ideation (*n = 118)*					
< 1 hour[b]	85 (72)	77 (76)	8 (47)	6.15	.01
1 hour or more	33 (28)	24 (24)	9 (53)		
Suicide Attempt History, n (%) (CSS, C-DISC, or ASI)	25 (21)	19 (19)	6 (33)	2.14	.14

[b] Reference category

8. Characteristics of suicidal ideation that predict a future suicide attempt among ideators with or without a lifetime suicide attempt history

Four specific characteristics of SI were examined as predictors of a future SA (Table 6) in the multivariate analyses (Model 2). Out of this four, SI length greater than 1 hour (vs. less than 1 hour) (*OR* = 3.6, $p < .05$) was associated with a future SA adjusting by gender, SA history, and BDI at baseline. Frequency of SI, wish to die, and timing of SI were not significantly associated with a future SA. Neither the demographic characteristics nor SA history predicted future SA.

Table 6. Logistic Regressions Predicting Suicide Attempt (SA) at Follow-up (n = 122)

	Model 1 OR[a] (95% CI)	Model 2 OR (95% CI)
Sex	…	1.0 (0.4-3.7)
BDI	…	1.0 (1.0-1.1)
Suicide Attempt History	…	1.4 (0.3-5.5)
Timing of most recent SI		
> 2 weeks ago[b]		
Within past 2 weeks	0.6 (0.2-2.5)	0.7 (0.1-3.2)
Frequency of ideation, most recent episode		
> 1 every 2 weeks[b]		
> 1 per week	1.8 (0.6-5.8)	1.3 (0.4-4.7)
Wish to die, most recent episode		
Did not want to die/uncertain[b]		
Wanted to die	2.2 (0.7-6.7)	1.2 (0.3-4.8)
Length typical single ideation, last episode		
< 1 hour[b]		
1 hour or more	3.1* (1.0-9.3)	3.6* (1.0-12.7)

[a] Analyses adjust for gender, suicide attempt history, and BDI score at baseline.
[b] Reference category
$^{+}p < .10$; $^{*}p < .05$; $^{**}p < .01$
… Indicates different values for each regression.

9. Transition timing between baseline and first-time SA

Of the 18 adolescents who made an attempt within the follow-up period, 11 made one SA – 5 within a year from baseline, 3 within two years of baseline, and 2 adolescents 3-4 years later (the interval for 1 participant was unknown). Seven adolescents made 2 SAs, with the most recent attempt occurring 1-5 years (M = 2.4, SD = 1.4) from baseline (information was not available on the approximate timing of their first attempt).

Among the adolescents who made one SA, those with a baseline SI length of one hour or more (n = 5) made a future SA, on average, within less than one year (M = 0.6, SD = 0.9), compared to individuals with typical SI of less than one hour (n = 5), whose future SA occurred within about 2 years of their baseline interview (M = 2.4, SD = 1.1), $t = 2.78$, $p < .05$. This difference was even larger when examining adolescents (n = 8) that endorsed SI without a SA history at baseline. Among these adolescents, those whose baseline SI lasted one hour or more made the transition to a future SA, on average, within less than one year (M = 0.5, SD = 1.0), compared to individuals with typical SI of less than one hour, whose SA occurred within about 3 years (M = 2.8, SD = 1.0), $t = 3.25$, $p < .05$.

Results Study 2

Part 2

10. Persistent SI and transition to SA among only ideators only

Of the 122 adolescents who reported recent suicide ideation in the CSS or the DISC 2.3 and also completed the ASI-SI at baseline, 97 did not report SA history at baseline.

During the follow-up interval, 12% (n = 12) of adolescents made a SA, 9 through ingestion, 2 with a gun, and 1 through attempted hanging (*Transition to SA*, SI → SA). Almost half of the remaining sample, 41% (n = 40), expressed SI in the previous year on the DISC-IV with no SA (*Persistent SI*, SI → SI), and 46% (n = 45) did not endorse any suicidal behavior on the ASI or the DISC-IV (SI → no SB).

11. Demographic characteristics at baseline and follow-up among ideators only

There were no significant differences by age, gender, race/ethnicity or psychiatric disorders at baseline among those who made a future attempt, expressed ideation-only, or who did not endorse any suicidality at follow up (Table 7).

Adolescents who made the transition to a SA (SI → SA) more often met criteria for a mood disorder or for any psychiatric disorder in the previous year, compared to those who did not make the transition (SI → no SB) (Table 7). The transition to SA group (SI → SA) did not differ from the persistent SI group (SI → SI) in the number of psychiatric diagnoses at follow-up.

Table 7. Demographics and psychiatric diagnoses of only ideators who took part in the follow up

	Baseline	Follow-up				
	All (n = 97)	SI→No SB (n =45)	SI→SI (n = 40)	SI→SA (n = 12)	χ^2 or F	*p*
Age (Baseline), M (SD)	15.4 (1.2)	15.3 (1.3)	15.5 (1.3)	15.4 (1.1)	0.47	.63
BDI Score (Baseline), M (SD)	15.1 (9.4)	13.9 (8.2)	15.6 (10.1)	20.1 (9.2)	2.40	.09
Sex, n (%)						
Female	55 (57)	26 (58)	23 (57.5)	6 (50)	0.25	.88
Male	42 (43)	19 (42)	17 (42.5)	6 (50)		
Race/Ethnicity, n (%)						
White	53 (55)	24 (53)	24 (60)	5 (42)	14.07	.08
Black	15 (16)	9 (20)	6 (15)	0 (0)		
Latino	11 (11)	5 (11)	4 (10)	2 (17)		
Asian	10 (10)	2 (4)	6 (15)	2 (17)		
Other	8 (8)	5 (11)	0 (0)	3 (25)		
DISC Diagnosis (Baseline), n (%)						
Mood	19 (20)	6 (13)	10 (26)	3 (27)	2.54	.28
Anxiety	16 (17)	6 (15)	7 (23)	3 (33)	1.63	.44
Substance Use	10 (10)	3 (7)	4 (10.5)	3 (25)	3.28	.19
Any Diagnosis	36 (37)	14 (31)	16 (40)	6 (50)	1.69	.43
DISC Diagnosis (Follow up), n (%)						
Mood	9 (9)	1 (2)	5 (12.5)	3 (25)	6.68	.03
Anxiety	16 (16.5)	4 (9)	10 (25)	2 (17)	3.99	.14
Substance Use	27 (29)	8 (19)	14 (37)	5 (27)	5.15	.08
Any Diagnosis	39 (40)	12 (27)	20 (50)	7 (63)	7.51	.02

SB: suicidal behavior (ideation or attempt); SI: suicidal ideation; SA: suicide attempt

12. Characteristics of the suicidal ideation episode reported on the ASI at baseline

Thirteen per cent (n = 12) of the 97 adolescents that completed the ASI-SI Module interview and gave more details about the characteristics of their most recent SI episode reported disclosing their ideation to an adult. Fifty-one percent (n = 40) reported an ideation frequency of more than once every two weeks, with 40% (n = 31) reporting that they ideated more than once every 3 days and the remainder reporting that they ideated more than once per week (n = 7, 9%). Most adolescents reported that they did not want to die during their most recent ideation episode (n = 63; 66%), with 20% (n = 19) reporting they wanted to die and 15% (n = 14) reporting that they were uncertain about wanting to die. The typical length of a single instance of the adolescents' most recent SI was less than 30 minutes (n = 56; 60%), followed by 31-60 minutes (n = 16; 17%), 1-23 hours (n = 16; 17%), or more than 24 hours (n = 5; 5%). Twenty-two percent (n = 21) of adolescents gave previous warnings or expressed threats about their ideation (10.5% veiled, 11.6% specific). Seven percent (n = 7) reported that they currently wished to die. Finally, most participants did not receive mental health treatment for their ideation (n = 90, 96%).

13. Characteristics of suicidal ideation episode that predict persistent ideation and transition to a first-time suicide attempt

In the separate multinomial regression analyses (Table 8, Model 1), no SI characteristics at baseline were associated with persistence of SI (i.e., ideators who continued to report SI but did not report a SA).

However, specific characteristics of the SI episode emerged as significant predictors of the transition to SA. Wanting to die (OR, 7.7; 95% CI, 1.4-41.0; $p < 0.05$) or being uncertain about *wanting to die* (vs. *did not want to die*) (OR, 10.0; 95% CI, 1.3-

77.5; $p < .05$), along with SI length greater than 24 hours (vs. < 30 minutes) (OR, 26.5: 95% CI, 1.6-448.4; $p < 0.05$), were associated with the transition to an attempt, adjusting by BDI and gender. Disclosure, frequency of SI, current wish to die, and mental health treatment after the SI were not significantly associated a future SA.

14. Transition timing between baseline and first-time SA

Eight of the 12 adolescents who made an attempt within the follow-up period also made 1-3 SAs within a year from baseline, 3 within two years of baseline. Two of the 12 adolescents made a SA 3-4 years later. Four adolescents made 2 SAs, with the most recent attempt occurring 1-5 years (M = 2.8, sd = 1.7) from baseline (information was not available about approximate timing of their first attempt).

Among adolescents who made one SA during follow-up (n = 8), those with a baseline SI length of one hour or more made a SA within a shorter period of time (M = 0.5, sd = 1.0), compared to individuals with typical SI of less than one hour (M = 2.8, sd = 1.0; t = 3.25, p = .02).

Table 8. Multinomial logistic regressions predicting persistent ideation and suicide attempt at follow-up

	SI → No SB n (%)	SI → SI n (%)	O.R[a] (95% CI)	*p*	SI → SA n (%)	O.R[a] (95% CI)	*p*
Tell responsible adult							
Yes[b]	5 (11)	3 (8)			4 (33)		
No	39 (89)	36 (92)	1.5 (0.3-6.7)	.61	8 (67)	0.2 (0.0-1.0)	0.5
Frequency of ideation, most recent episode							
> 1 every 3 days	11 (32)	15 (44)	1.7 (0.6-4.7)	.33	5 (50)	2.6 (0.5-13.8)	.27
> 1 per week	2 (6)	3 (9)	2.0 (0.3-13.5)	.50	2 (20)	7.2 (0.7-80.0)	.11
> 1 every 2 weeks[b]	21 (62)	16 (47)			3 (30)		
Wish to die, most recent episode							
Did not want to die[b]	35 (78)	25 (64)			3 (25)		
Uncertain	3 (7)	7 (18)	2.9 (0.6-13.3)	.18	4 (33)	**10.0 (1.3-77.5)**	**.03**
Wanted to die	7 (16)	7 (18)	1.4 (0.43-4.4)	.59	5 (42)	**7.7 (1.4-41.0)**	**.02**
Length typical single ideation, last episode							
< 30 minute[b]	28 (62)	25 (68)			3 (27)		
31-60 minutes	10 (22)	3 (8)	0.3 (0.1-1.3)	.12	3 (27)	2.7 (0.4-16.9)	.30
1-23 hours	6 (13)	7 (19)	1.3 (0.4-4.3)	.70	3 (27)	4.7 (0.7-31.0)	.11
> 24 hours	1 (2)	2 (5)	2.6 (0.2-31.0)	.46	2 (18)	**26.5 (1.6-448.4)**	**.02**
Previous warnings/threats							
Yes, Specific[b]	4 (9)	5 (13)			2 (17)		
Veiled	6 (14)	2 (5)	0.7 (0.2-3.0)	.66	2 (17)	0.5 (0.1-3.5)	.47
No warning	34 (77)	32 (82)	0.3 (0.0-2.2)	.22	8 (67)	1.2 (0.1-15.3)	.91
Current wish to die							
No wish[b]	43 (96)	36 (90)			11 (92)		
Any wish to die	2 (4)	4 (10)	1.6 (0.3-11.9)	.52	1 (8)	.0.8 (0.1-11.9)	.87
Mental health treatment associated w/most recent SI							
Yes[b]	2 (5)	1 (2.5)			1 (9)		
No	41 (96)	39 (97.5)	1.7 (0.1-20.5)	.67	10 (91)	0.3 (0.0-5.1)	.44

[a] Analyses adjust for gender and BDI score at baseline. [b] Reference category of the predictors was the less risky category
SB: suicidal behavior (ideation or attempt); SI: suicidal ideation; SA: suicide attempts

Discussion

Discussion

The present report seeks to examine the severity in forms and characteristics of suicidal ideation using data from two longitudinal community- and school-based studies with adolescents. In study 1 suicidal ideation was categorized based on its severity: passive ideation, serious ideation and suicide plan. The main aims were to explore the incidence, persistence, and transitions between the different forms of ideation and the prospective associations between recognized risks factors, such as psychiatric disorders or minority status, and the SI forms, with the ultimate goal of understanding the development of the suicidal thought process. In study 2, we focused on characteristics of ideation, such as *wish to die*, and frequency or length of the suicidal episode, to identify which characteristics of ideation increased the risk for a future suicide attempt over and above psychiatric disorders. The longitudinal data allow us to understand how different forms of ideation change over time and the association of different types of risk with future suicidal behavior.

First, we discuss the unique results found in studies 1 and 2 including clinical implications, strengths, and limitations. Then, in order to understand our findings, we examine two theoretical models proposed to explain the suicidal process. We finish the section with a common discussion about both studies.

1. Discussion – Study 1

1.1. Parent-adolescent agreement

1.2. Suicidal ideation along a continuum of severity

1.3. Incidence, persistence and transition between forms of ideation

1.4. Predictors related to incidence of ideation

1.5. Association between the forms of ideation and psychiatric disorders at baseline with the forms of ideation at follow-up

1.6. Preliminary analyses with suicide attempts

1.7. Suicidal behavior among Puerto Rican minority adolescent

1.8. Implications for assessment and treatment

1.9. Strengths

1.10. Limitations

To our knowledge, no other study has prospectively examined the incidence, persistence, and transition between the different severity forms of suicidal ideation in a community sample of early adolescents. The study also aimed to clarify the impact of belonging to a minority group on the developmental process of suicidal ideation, disentangling the effect of minority status from cultural and socio-economic variables by comparing adolescents of the same ethnic background, Puerto Rican, living in a predominantly non-Latino society, while their counterparts are living in their mother land. Considering that suicidal behavior sharply increases after the age of 10 and the vast majority of the transitions from suicidal ideation to suicide plans and attempts happen within the first year after ideation onset (Nock et al., 2003), this study is unique positioned

as suicidal behavior was repeatedly assessed over three years in adolescents aged 10-13 years at baseline.

Four main findings emerged from this study: 1) among adolescents without suicidal behavior at wave 1, minority status and also to meeting the criteria for classification as an anxiety disorder at wave 1; 2) endorsement of passive ideation and active ideation at wave 1 were prospectively associated with the presence of both forms of ideation at follow-up, active ideation being the strongest predictor of future ideation; 3) psychiatric disorders differentially predicted the severity in forms of ideation at follow-up in the presence of ideation at wave 1; more specifically, mood disorders were associated with passive ideation, and anxiety and disruptive behavior disorders were associated with active ideation at follow-up; and 4) lastly, early adolescents living in the South Bronx reported higher rates of ideation at any wave compared to those in Puerto Rico over and above demographics, psychiatric disorders, past-year suicide attempts, and socio-economic risks.

1.1. Parent-adolescent agreement

Parental reports of adolescents' suicidality consistently tend to underestimate its prevalence (Klimes-Dougan, 1998; Walker et al., 1990), and comparisons of adolescent and parent reports on suicidal behavior have yielded low levels of concordance, indicating that parents seem not to be aware of their children's suicidal thoughts and acts (Kerr, Owen, Pears, et al., 2008; Klimes-Dougan, 1998; Martin, Ford, Dyer-Friedman, Tang, & Huffman, 2004; Rey, Schrader, & Morris-Yates, 1992; Sourander et al., 2006). Our findings were in accordance with these reports. Parents reported lower rates of suicidal behavior than the adolescents, and parent-adolescent agreement on suicidal ideation (SI)

and suicide attempts (SA) was very low. Parents failed to identify most self-reported cases of SI at any wave and SA at waves 1 and 3. Agreement only reached a moderate level for past-year SA at wave 2. Similarly, Foley et al. (2006) reported a non-significant parent-adolescent agreement for past 3-month ideation and suicide plans, however, agreement reached significance for SA and any suicidality in the past 3 months.

In the present study, parents were asked whether their children had disclosed their thoughts of death, being dead, killing themselves, or any suicide plans in the past year. We combined parental and adolescent reports because the expression of suicidal ideation is considered a serious indicator that the behavior actually happened (McAuliffe, 2002). The percentage of adolescents denying suicidal ideation and suicide attempts while their parents reported it was higher than expected. Explanations for this discrepancy can be manifold. First, the discrepancy may be due to the format of the assessment: children and adolescents are more likely to report suicidal behavior when asked in a self-report questionnaire than in the context of an interview, especially if the self-report is anonymous. Secondly, long intervals of retrospective recall (e.g., last year, lifetime) pose difficulties particularly for children and may lead to underestimations of behaviors. Third, a good self-concept may promote forgetting past suicidal thoughts or reinterpreting them as an adaptive mechanism. Fourth, children and early adolescents who experience intellectual challenges may be sensitive to inconsistences in wording, formats, and examiner demands (Evans et al., 2005; Klimes-Dougan, Safer, Ronsaville, Tinsley, & Harris, 2007). On the other hand, parental mental state also seems to influence their accurate report on suicidal behavior. Klimes-Dougan et al. (1998) reported that the mother-child correspondence between depressed mothers and their children was less consistent than between mentally health mothers and their children. As a matter of fact,

the latter were twice as likely to agree with the suicidal rating of their children. Moreover, over-reporting mothers had more personality disorder symptoms than the mothers who agreed with their children.

A previous study suggested children from mother-child dyads who disagreed on reports of a suicide attempt have a lower age-of-onset of their SA, lower global assessment of functioning, and twice the average number of previous SAs, compared to children whose mothers' reports agreed with their self-reports (Walker et al., 1990). These findings suggest that levels of parent-youth agreement may be capturing different groups of suicide risk.

As a conclusion, parent report on suicidal ideation and suicide attempts is not an acceptable substitute for reporting by their children, although parents can be a valuable supplement. For instance, disclosure of suicidal ideation to others may have important meanings (e.g., help-seeking, acting out) and can serve as a warning sign providing an opportunity for intervention. In the context of broader risk assessment, parents can report on other information that is critical, such as youth access to lethal means at home (e.g., firearms, knifes, or medication). Areas for future research could involve: a) the exploration of whether those teens that share their thoughts differ from those who keep the experiences for themselves; b) the potential protective effect of the parent-youth agreement; and c) how the impact of the disclosure on others and their subsequent reactions may impact on the adolescent's suicide risk.

1.2. Suicidal ideation along a continuum of severity

Longitudinal studies on suicidal behavior in children and early adolescents are rare. Moreover, the diversity in sample characteristics and other methodological variations, such as assessment formats (e.g., interview vs. self-report questionnaire), timeframes (e.g., last week vs. lifetime, etc.), and single vs. multiple informants, hampers the establishment of a basic rate of suicidal behavior in this developmental period and the comparison of the estimates between studies. In the present study, we used combined parent-adolescent reports on suicidal behavior to define suicidal behaviors. However, in order to allow for comparison with published studies, we also reported the rates of suicidal ideation based on the adolescent and parent reports separately.

The literature suggests that rates of suicidal behavior increase sharply at the age of 10 (Bolger et al., 1989; Borges, Benjet, et al., 2008), following an inverted U trajectory from early adolescence to adulthood, and peaking around the age of 15-16 years old (Boeninger et al., 2010). Based on this pattern, we expected that our rates of past-year suicidal ideation reported on the Diagnostic Interview Schedule for Children-IV (DISC-IV) would increase over the 3 years of the study duration. However, our estimates of suicidal ideation decreased over time. In wave 1, the mean age of the sample was 11.5 years (sd = 1.2, age range 10-14), and the self-reported ideation range was 15.3%-19.5%. In wave 2, the mean age was 12.5 years (sd = 1.2, age range 11-15), and the ideation rates ranged between 6.7% and 14%. Finally, the mean age was 13.4 years (sd = 1.3, age range 12-16) in wave 3 and the ideation range was 4.7%-10.7%. This reduction of the prevalence may be attributed to a methodological artifact observed in longitudinal studies known as *attenuation effect*, rather than a real decline in the symptoms. This effect is observed when individuals tend to report fewer symptoms in subsequent assessment

measurements, even when this is unlikely or even impossible (Jensen et al., 1993: Piacentini et al., 1999), and it has been detected in different diagnostic instruments, including the DISC, in English and Spanish (Lucas et al., 1999). Possible explanations for this artifact include: 1) "educational effect" of the first interview, that raises the threshold for reporting symptoms at subsequent interviews; 2) "avoidance effect", whereby the interviewee answers negatively to stem questions to avoid responding to more questions; 3) "telescoping effect" by means of the interviewee refers to events that occurred prior to the timeframe specified in the question/interview, increasing the symptom prevalence at wave 1; and 4) regression towards the mean (Piacentini et al., 1999). Another explanation for the decrease of rates of suicidal ideation over time may be because the higher risk families were probably more likely to drop out from the study at waves 2 and/or 3.

The rates of self-reported suicidal ideation at wave 1 were higher than in other studies with children and early adolescents, with reported rates ranging between 10% and 15% (Kerr, Owen, Pears, et al., 2008; Klimes-Dougan et al., 1999; Pfeffer et al., 1984). A study with report-by-age rates of last-week suicidal ideation (defined as the combination of the 3 answer options of the Beck Depression Inventory (BDI): *I think about killing myself but I would not do it*, *I would like to kill myself*, and *I would kill myself for sure if I had the chance)* showed that at age 12, 14.3% of the student boys reported suicidal ideation, and that rate reached its highest prevalence of 16.3% at the age of 13, decreasing in subsequent assessments until the age of 29 years. In the same study, parents reported on child's ideation in the past 6 months on the Child Behavior Checklist (CBCL), with rates of 5.4% at child's age of 10 and again at 11, 4.5% at age 12, and 5% at age 13. In our study, the prevalence reported by parents was also higher (around 12%). The discrepancies in the rates between studies may be due to the inclusion of girls in the sample, the use of

different timeframes (i.e., past year-DISC-IV versus six month-CBCL or past week-BDI), and the different forms of ideation included.

We defined three mutually exclusive categories of suicidal ideation on the basis of the most severe thoughts endorsed at each wave: passive ideation, serious ideation, and suicidal plans. This hierarchy of ideation has been previously used in other studies (Foley et al., 2006; McAuliffe, 2002), and its applicability to this age group has been tested before (Brent et al., 1986). The notion that suicidal ideation and suicide attempts are a continuum manifestation of the same phenomenon is useful to understand the progression in the continuum of suicidality (Sveticic & De Leo, 2012). This premise entails that the transition from ideation to attempt is more likely among those adolescents with a suicide plan than for those without a suicide plan (Borges, Angst, et al., 2008). In other words, the more severe the ideation, the higher the risk of attempting suicide (Lewinsohn et al., 1996). The most frequent form of ideation endorsed at any time point was passive ideation ("*passive thoughts about death, people who had died or being dead"*) (8.7%-19.7%), followed by serious ideation ("*serious thoughts about killing oneself"*) (1.7%-3.6%), and suicidal plan ("*having a plan about how to do it")* (0.9%-1.2%). As it has been reported in older samples, the prevalence rates of suicidal ideation were reversely correlated with the severity of suicidal intent (McAuliffe, 2002).

One possible explanation for our elevated rates of suicidal ideation may be the inclusion of passive thoughts. The prevalence of serious ideation and suicide plans was much lower. Passive and transient forms of ideation have been overlooked in many community- and student-based studies with adolescents (Borges, Angst, et al., 2008; CDC, YSRB, 2013; Evans et al., 2005; Foley et al., 2006; Gould et al., 1998; Nock et al., 2013), with *Wanting to die* or other forms of active ideation that imply some intentionality of

killing oneself or making an attempt (e.g., *serious thoughts of committing suicide or killing yourself*) being usually the lowest severity forms considered. Studies including passive forms of ideation have found results similar to ours. For example, Vander Stoep et al. (2009) assessed a sample of 521 early adolescents 4 times over a period of two years, and included passive and active forms of ideation. *Thoughts of death and dying* were the most frequently reported thoughts (32.9% over two years), even within a past-2-week timeframe, suggesting that having some passive suicidal thoughts is not uncommon during early adolescence. Although these authors stressed the importance of assessing the most passive form of ideation to prevent future negative outcomes, they did not report specifically on the suicide risk that those forms might confer.

In a school-based longitudinal study with older adolescents, which also included lifetime rates of passive and active thoughts ("*Did you feel so bad that you thought about death or dying?" "Did you wish you were dead?"* "*Did you think about hurting or killing yourself?"* or *"Have you ever made a suicide plan?*"), Andrews & Lewinsohn (1992) found that 16.3% of the adolescents had thoughts of death, 13.3% wished they were dead, 12.9% thought about killing themselves, 8.3% ever had a plan, and 4.6% experienced any form of ideation one year later. Although lifetime suicidal ideation at T1 was a risk factor for attempting suicide between T1 and T2 after controlling for SA at T1, the transition between the forms of ideation or the independent contribution of each one of the forms on the future risk of attempted suicide T2 was not explored.

Our findings of the high rates of passive ideation in adolescents were thus consistent with previous research and extend it by demonstrating how different forms of ideation were prospectively associated with SI at follow-up independently of psychiatric disorders, gender, minority status, past-year SA, and socio-economic risks. Specifically,

one-third of the adolescents with passive ideation and two-thirds with active ideation at wave 1 reported ideation at follow-up; the same form or a more severe one.

With relation to gender, we did not find any differences between boys' and girls' rates of suicidal ideation at any wave, although we were expecting differences to appear over time. Most studies with children and early adolescents fail to find any differences by gender (Klimes-Dougan et al., 1999; Lewinsohn et al., 2001; Pfeffer et al., 1984; Taussig et al., 2014). The mean age of our sample at wave 3 was 13.4 years. Previous research with a similarly aged sample did not find gender differences in past 6-month suicidal ideation but did find higher rates of ideation in girls in later assessments when adolescents were older (Steinhausen et al., 2006).

1.3. Incidence, persistence and transition between the forms of ideation

One of the main goals of the present study was to describe the incidence, prevalence and transition between the different severity forms of ideation over a three-year critical period of heighted risk for suicide. The probability of reporting any ideation at waves 2 and/or 3 was significantly higher among those adolescents who had already reported suicidal ideation than among those who did not report any ideation at wave 1.

With regard to the incidence of ideation, among those who did not report any suicidal behavior at baseline, 13.5% reported ideation over a two-year follow-up period, passive ideation being the most frequent form (11.9%). Prospective studies with data on self-reported incidence of serious suicidal ideation report rates that range from 1.7% for suicide plans and 1.7% for suicidal ideation assessed with the Center for Epidemiologic Studies Depression Scale (CES-D) (Garrison et al., 1991; McKeown et al., 1998); 4.3% in the K-SADS (Lewinsohn et al., 1996); and 8.4% between the ages of 13 to 16, and 5.1%

between the ages of 16 to 20 years reported in the Youth Self Report (YSR) (Steinhausen et al., 2006). Our rates may be higher due to the inclusion of passive ideation, the shift in the ideation rates at the age of 10, the combination of parent and/or youth report, or the drastic difference in the timeframe (e.g., worst week in the month prior to evaluation in the K-SADS, past two weeks in the CESD, and last 6 months in the YSR) compared to past-year interval (DISC-IV) for the last two years.

Cross-tabulation of the forms of ideation at wave 1 with the forms of ideation at waves 2 and/or 3 indicated that 39% of those who had reported ideation at wave 1 also reported any form of SI at follow-up (9.6% of the total sample). Furthermore, among those who presented SI at follow-up, 8.2% transitioned to a more severe form of ideation and 31.2% reported the same or less severe form of ideation. Kerr and colleagues already indicated that the riskiest period for repetition is within the year subsequent to the endorsement of ideation (Kerr, Owen, & Capaldi, 2008; Kerr, Owen, Pears, et al., 2008). Our findings build on Kerr's results by showing that the risk for repetition varied depending on severity in form of ideation. While passive ideation was more prevalent at wave 1 than serious ideation and suicide plans, it was also the most transient form. That is to say, two thirds of the adolescents reported passive ideation only once over the three years. On the other hand, serious ideation and suicide plans were less frequent at wave 1 but showed the highest rates of persistence (51% reported the same or less severe form of SI) and transition to a more severe SI forms (15%) at follow-up. In sum, the more severe the ideation, the higher risk for repetition or transition to a severe form of SI. Another study with an older sample of adolescents found similar results. In a three-wave longitudinal study (aged 11-19 at baseline), suicidal thoughts were measured with questions taken from the Youth Risk Behavior Survey (CDC, YRBS, 2004), framed by the

statement. "*Sometimes people become so unhappy with their lives that they consider suicide"*. Ideation was asked as *"In the past 12 months, how many times have you seriously thought about committing suicide?"*; plans were asked as *"In the past 12 months, how many times have you made a plan to commit suicide?"*. Girls showed the highest rates of serious ideation and plans at the age of 15, while the prevalence in boys reached a peak later, at the age of 19. With regard to the overlap in the forms of ideation, 24.5% of those who seriously thought about suicide once in the past year had also made a suicide plan, and among those who reported serious suicidal ideation 2 or more times, 34.2% also reported having a suicide plan once and 42.3% reported having a plan two or more times. All of these findings suggest that close monitoring after the endorsement of suicidal ideation is needed to prevent persistence or the transition to a more severe form (Boeninger et al., 2010)

It should be noted that although most of the studies agree that persistent ideation implies a higher risk for future negative outcomes than one–time episodes, some studies fail to find any differences between one-time versus persistent ideators, such as the severity of depression (Kerr, Owen, & Capaldi, 2008) or the likelihood to have made a suicidal plan or SA (Wilcox et al., 2010). One possible explanation for these discrepancies is that under the construct of *persistent suicidal ideation*, some individuals may experience an unstable ideation with daily fluctuations while others may be continuously suicidal or non-suicidal. More details on the characteristics of the suicidal episode are needed to clarify which profile of suicidal ideation is associated with an increased suicide risk.

1.4. Predictors related to incidence of ideation

As we hypothesized, among those early adolescents without any past-year ideation or no history of SA at baseline, living in SB (minority status) and anxiety disorders were associated with higher odds of reporting ideation at follow-up in a model that included demographics, psychiatric disorders and socio-economic risk factors. Neither gender nor mood disorders were associated with incidence of ideation.

Data from cross-sectional studies and, more recently, longitudinal studies, show that anxiety disorders in childhood increase the risk of subsequent depression in adolescence and adulthood (Bittner et al., 2004; Stein et al., 2001; Woodward & Fergusson, 2001). How this transition between disorders takes place is still unclear. Trying to shed light on the potential mechanisms, Bittner et al. (2004) found that comorbidity between anxiety disorders, severe impairment due to anxiety disorders, and comorbid panic attacks with any anxiety disorder at baseline (14-24 years) were associated with an increased risk to develop MDD four years later. In the final model, severe impairment due to anxiety disorders was the only characteristic that remained significant, suggesting that impairment may lead to an accumulation of stressful experiences or reduced academic and social performance, thus triggering the onset of depression and possibly ideation.

In a recent review of the role of anxiety disorders/symptoms/traits and suicidal behavior among adolescents, Hill et al. (2011) found that anxiety, especially panic attacks or panic symptoms, was associated with suicidal ideation and attempts over and above depression and other psychiatric disorders, but not with suicide completion; although consensus has not been reached yet. Most of the studies reviewed included adolescent with an age range of 14 to 20 years and were conducted in psychiatric or high-risk samples,

with some exceptions. The few community-based studies that included early adolescents report different results. While one of these studies showed that anxiety disorders remained significantly associated with suicidality after adjusting for other disorders, it was no longer significant when demographics and poverty were added to the model (age range, 9-16 years) (Foley et al., 2006); in contrast, in the other study anxiety remained significantly associated with suicidal ideation only, and with suicide attempts after controlling for demographics, social position and each one of the other diagnoses (age range 7-18 years) (Gould et al., 1998). The authors of the review highlighted the need for longitudinal research examining the temporal pathways between anxiety and suicide-related outcomes.

Borges et al. (2008), using data of a representative sample of Mexican adolescents aged 12-17 living in Mexico, found that history of individual psychiatric disorders was associated with onset of serious ideation (especially dysthymia), plans (alcohol abuse with dependence), and attempts (dysthymia). As a group, mood disorders were strongly associated with onset of ideation, and impulsive-control disorders with plan and attempts. Anxiety disorders were associated with the three suicidal behaviors (serious ideation, suicide plan, and SA), but showed lower ORs.

Studies with adult samples that have specifically looked at the onset/incidence of ideation have found that anxiety disorders, specifically panic disorders, as well as, mood disorders were both associated with new cases of suicidal ideation at follow-up after controlling for the other disorders (Boden, Fergusson, & Horwood, 2007; Borges, Angst, et al., 2008; Sareen et al., 2005; Zhang, Law, & Yip, 2011). In a community-based longitudinal cohort study with 6,715 younger, model-aged and older adults (age range, 20-64 years), Batterham et al. (2013) explored the role of anxiety symptoms as precursors of depression and suicidal ideation and found that anxiety symptoms account for a larger

proportion of the incidence of both depression and suicidal ideation later than depressive symptoms. The different impact of anxiety and depression on future depression and suicidal ideation was more pronounced in the younger cohort. Sareen et al. (2005) demonstrated that simple phobia, GAD, and OCD at baseline remained associated with first-ever incidence of suicidal ideation after adjusting for psychiatric disorders, each one of the other anxiety disorders, and socio-demographics variables. Ten Haven et al. (2013) based on retrospective data in adults, that MDD did not increase the risk of ideation before the age of 12 years, and that the impact of MDD on suicidal ideation was 4 times higher when they were 13 or older. They found that 5 anxiety disorders and 3 disruptive behavior disorders, besides dysthymia and bipolar disorders, were associated with incidence of ideation, but they only adjusted for sex and age.

Similar to suicidal behavior, mood disorders are rare prior to the onset of puberty, and both increase sharply during middle adolescence, especially among girls. Precursors of mood disorders are likely to be manifested pre-pubertally and include anxiety, impulsive aggression, neurotic traits, and cognitive distortions such as pessimism (Bridge et al., 2006; Wittchen, Beesdo, Bittner, & Goodwin, 2003). On the contrary, the onset of anxiety disorders starts earlier in life, during childhood (Lavigne, Hopkins, Gouze, & Bryant, 2015; Merikangas, Angst, Eaton, & Canino, 1996; Regier, Rae, Narrow, Kaelber, & Schatzberg, 1998; Snyder et al., 2009). The rates of anxiety and disruptive behavior disorders are already elevated before the age of 10; in fact, anxiety disorders are the most frequent condition during adolescence, followed by disruptive and mood disorders (Merikangas et al., 2010). One explanation for our findings may be that the presence of anxiety disorders in early adolescents is a precursor, not only of depression, but also of suicidal ideation when the rates of mood disorders are still very low. Moreover, the

presence of suicidal ideation in early stages of life is also an important prognostic indicator, as it is linked to worse clinical features of MDD among adolescents, including longer duration of the episode, and episode recurrence (Lewinsohn et al., 1994).

The mechanisms that may be underlying the association between anxiety and suicidal behavior remain underexplored. A theory that proposes an explanation for the link between anxiety and suicide is the *Looming Vulnerability Theory (LVT)* (Riskind, 1997; Riskind, Black, & Shahar, 2010; Riskind, Williams, Gessner, Chrosniak, & Cortina, 2000). According to this theory, looming vulnerability is conceptualized as a maladaptive cognitive style that involves the mental representation of that event as an escalating and unmanageable threat or adversity. This expectation or perception of rapidly escalating risk, together with the urgency to avoid or escape the threat, results in anxiety. A sudden, rapid and unexpected loss will provoke greater looming vulnerability than other, more gradual and expected events. Extensive research supports this theory, providing evidence that looming vulnerability differs from other cognitive risk factors for anxiety (Risking, 1997), and underlies common features of numerous anxiety disorder symptoms (Williams, Shahar, Riskind, & Joiner, 2005).

LVT proposes a series of causal chains that increases the risk of suicidality (Figure 1) (Rector, Kamkar, & Riskind, 2008; Riskind, Long, Williams, & White, 2002). Suicide is often precipitated by a stressful live event (e.g., the loss of a loved one). Based on the diathesis-stress model, the interaction between the life event and looming maladaptive style results in anxiety. A parallel causal chain involves the interaction between the life event and hopelessness or other depressive cognitive styles that correspond to depression. In this framework, the individual will perceive the current situation as irrevocable, and becoming more painful, creating a sense of urgency and desperation to escape. When the

individual is unable to identify alternative strategies to circumventing the negative anticipated outcome, suicide is considered as the only mean of avoiding looming risks or danger and intolerable psychological pain in living. Both chains may lead to suicide but the combination of hopelessness and looming vulnerability will produce the most intense desperation and suicidality.

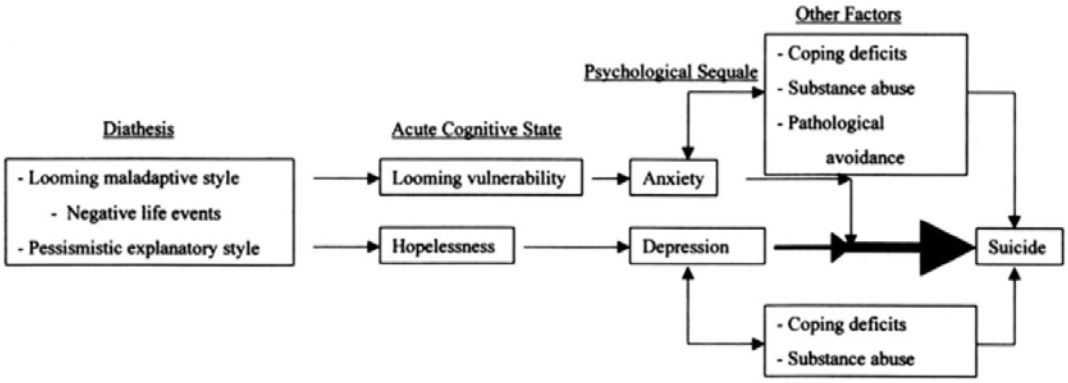


*Figure 1. Causal chains of the synthesis of suicide proposed by this model (*Riskind et al. 2002*)* *(Permission to reproduce)*

Besides the direct chain, an acute state of looming can also increase other behaviors to neutralize the pain or threat such as alcohol and substance use, or generate avoiding behavior (e.g., not going to school), which may increase the self-devaluating thinking and hopelessness.

In sum, given that in childhood and early adolescence the vulnerability to anxiety disorders is greater than to mood disorders, anxious cognitive styles plus the developmental inability to plan strategies may lead adolescents to conceive the situation as

worsening and unmanageable, subsequently heightening the risk of thinking about suicide as a way out. The link between mood and suicidal behavior may become more relevant later, when the rates of mood disorders start to rapidly increase after puberty, and therefore fueling the shift in the rates of suicidal behavior.

1.5. Association between the forms of ideation, minority status, and psychiatric disorders at baseline with the forms of ideation at follow-up

Another goal of the study was to explore the prospective link between the forms of ideation, passive ideation and active ideation, minority status, and psychiatric disorders at wave 1 with the forms of ideation reported in the subsequent two-year follow-up period. As we expected, both forms of ideation (passive and active) were associated with subsequent ideation above and beyond demographics, minority status, psychiatric diagnoses, past-year SA, and socio-economic risk factors. These findings are consistent with literature that suggests suicidal behavior is the strongest predictor of future suicidal behavior (Lewinsohn et al., 1996). Active ideation was the strongest predictor of both forms of ideation at follow-up. The impact of passive ideation on future ideation was significant but smaller than mood disorders on passive ideation and anxiety disorders on active ideation. However, although its impact was lower, it supports the authors' suggestion that even the less lethal form of ideation may be a risk factor for future suicidal behavior (Baca-Garcia, Perez-Rodriguez, Oquendo, et al., 2011; Lewinsohn et al., 1996).

Living in SB, thus being part of a minority group, significantly increased the risk of reporting passive and active ideation in the full model. The moderation effect of site on active ideation showed that living in SB was a risk factor for reporting passive ideation in

the follow-up period in the absence of active ideation, partially supporting the significant association of minority status with the incidence of ideation.

The main effect of gender was not associated with incidence of ideation or reporting any form of ideation at follow-up. However the significant interaction effect of gender and passive ideation indicated that being a girl was associated with higher odds of transitioning from passive ideation at baseline to a more severe form of ideation at follow-up, and therefore –we theorize– with an increased risk for attempting suicide, based on the idea of continuum of suicidality (Sveticic & De Leo, 2012). This finding was unexpected and needs replication, given the low power in the interaction models. Based on cross-sectional studies, the rates of transition from ideation to plan and to SA in adolescents did not vary by gender (Borges, Benjet, et al., 2008; Nock et al., 2013a). Nevertheless, our finding that girls were more likely to transition to a more severe form of ideation might underlay the substantial increase of the rates of suicide plans and attempts during middle late adolescence in girls, compared to boys (gender paradox) (Canetto & Sakinofsky, 1998).

In relation to psychiatric disorders, their contribution to future ideation decreased or disappeared when the forms of ideation were entered in the model. Specifically, mood disorders were no longer associated with active ideation and anxiety disorders were no longer associated with passive ideation in the presence of the SI forms. Disruptive behavior disorders were only associated with active ideation in the unadjusted or partially adjusted models, although the strength of the association decreased in the model with SI forms. Other studies have reported a meditational effect of ideation on the relationship between the psychiatric disorders and suicidal behavior (Brezo, Paris, Tremblay, et al., 2007; Lewinsohn et al., 2001; McKeown et al., 1998; Wichstrom, 2000). The significant

interaction effects indicated that having a disruptive behavior disorder and active ideation at wave 1 increased the risk of reporting passive ideation at follow-up. Anxiety disorders showed a stronger association with future active ideation in the absence of passive ideation at wave 1. Finally, mood disorders predicted passive ideation independently from the presence or absence of any form of ideation at baseline. None of the disorders interacted with a form of the ideation to predict the same form of ideation at follow-up; therefore, the risk of repetition of the forms of ideation was independent from psychiatric disorders. Again, these effects have to be interpreted with caution and need replication, as indicated before.

In sum, our finding seems to indicate that psychiatric disorders contribute to suicide risk at different levels, depending on the severity form of ideation and the stage of the development of the suicidal thought process, onset, persistence or transition. This differential pattern of association between disorders and the stages contradicts the studies that found the same risk factors for incidence and persistent of ideation (Borges, Angst, et al., 2008). One model that can be gleaned from our findings parallels the literature with adult and young samples; such literature suggests that while mood disorders are associated with suicide ideation, other disorders characterized by anxiety/agitation and problems with impulsive-control may be more important than depression in a certain developmental period increasing the likelihood that individuals act on their suicidal thoughts, by planning on how to kill themselves or actually attempting suicide (Bridge et al., 2006; Javdani et al., 2011; Nock et al., 2008; Ten Have et al., 2013). Ten Haven found that among ideators, prior mental health disorders were no longer significantly related to transitions in suicidal behaviors except for ADHD that was associated with a higher risk of making a suicide plan among ideators. Javdani et al. (2011) found that while MDD, but not impulsivity,

remained significantly associated with SI, the reverse association was found for SA; thus, when impulsivity was added to the model, the link between MDD and SA was no longer significant, impulsivity being the only significant predictor of suicidal acts.

1.6. Preliminary analyses with suicide attempts

The rates of adolescent self-report of SA ranged from 0% to 1.1% at wave 1, from 0% to 1.6% at wave 2, and from 0% to 1.9% at wave 3 depending on adolescent's age. Other studies found higher or similar rates of SA to ours. Based on mother report, Klimes-Dougan et al. (1999) reported rates of 3-6% of SA in the past 6 months on the CBCL, and based on adolescent-parent combined report on the DISC-2.3, Gould et al. (1998) reported rates 0.7% of SA in the last 6 months for the 7-12 years old group.

Based on parent and youth report, over the 3-year assessment period, a total of 27 adolescents attempted suicide for the first time, most of which were girls and living in SB. One boy and 2 girls repeated the SA. Within the same year of the attempt, the form of ideation most frequently reported was suicide plans, followed by serious thoughts of killing oneself. Four adolescents reported passive ideation and four did not report thinking about suicide during the same year that they attempted suicide. Our preliminary results support the continuum of suicidality, with more active thoughts of suicide occurring the same year of the attempts, and more attempters reporting ideation also in the preceding year. In most of these cases there was also a transition from a less to a more severe form of ideation from the prior year to the year of the suicide attempt.

1.7. Suicidal behavior among Puerto Rican minority adolescents

Capitalizing on Garcia Coll's integrative model for the study of minorities (Coll et al., 1996), we use the unique longitudinal data set of the Boricua Youth Study (BYS) to explore how ethnic minority status affects the incidence, persistence and transition between the forms of ideation. This is achieved by comparing two groups of Puerto Rican adolescents, one living in a context where they are part of the minority group (SB) and another that was living in their country of origin (PR), in a context where they are part of the majority culture and typically do not experience the same kind of racial and ethnic discrimination, or social alienation, than ethnic minorities do. As we were expecting, living in SB, thus being part of the minority group, was related to higher incidence of suicidal ideation compared to living in PR. Moreover, adolescents living in SB reported higher rates of ideation at any wave than those in PR.

It has been suggested that the particular cultural background of a specific Latino subgroup might contribute to the development of their children's mental health problems (Stevens & Vollebergh, 2008). If this hypothesis were true, the rates of suicidal ideation for both sites should have been the same.

It could be argued that children in SB have higher suicidal ideation because they are exposed to more social and economic risks than children in PR. According to our findings, minority children were indeed exposed to a greater number of socio-economic risks, however, the effect of minority status remained significantly associated with suicidal ideation over and above the cumulative risk index, supporting the idea that being a minority group seems to confer a unique risk for negative outcomes (Bird et al., 2007; Ramos-Olazagasti et al., 2013) compared to their majority culture counterparts.

Over the three waves of assessment, 57.9%, 66.1% and 64.2% of the early adolescents with suicidal ideation did not meet criteria for any psychiatric diagnoses in both sites. Moreover, the link between anxiety disorders and suicidal ideation was stronger in PR than in SB, leading us to think that other factors or experiences that are not contemplated in this study may be driving the higher rates of ideation in SB. For example, some cultural experiences, such as acculturation and discrimination, are phenomena that affect especially racial and ethnic minority groups, compared to their majority counterparts living in their home culture. These experiences seem to play an important role in the development of psychopathology among Latino minority adolescents (Beiser et al., 2002; Duarte et al., 2008; Zane & Mak, 2003; Zayas et al., 2005).

Research suggests that the process of acculturation – i.e., of adapting to the values and norms of a new culture (Berry & Kim, 1988) – is associated with risk for psychopathology. A greater level of acculturation has been consistently associated with externalizing symptoms and substance use, and less consistently with internalizing symptoms (Duarte et al., 2008; Mikolajczyk, Bredehorst, Khelaifat, Maier, & Maxwell, 2007). However, its role in relation to suicidal behavior in adolescence remains unclear.

Among adults, greater acculturation - often assessed by indicators such as immigrant generation, years in the U.S., English proficiency, or perceived acculturation- has been found to be associated with higher rates of suicide completion and suicidal behavior (Castle, Conner, Kaukeinen, & Tu, 2011; Fortuna et al., 2007; Sorenson & Golding, 1988a; Sorenson & Shen, 1996).

Findings among Latino adolescents are scarce and inconsistent (Canino & Roberts, 2001). One study of 158 6th to 8th-grade adolescents of Hispanic, white, and mixed

ancestry found that Spanish preference, as assessed by 3 questions about language, was associated with higher rates of suicidal ideation (Olvera, 2001). However, other research suggests that U.S.-born Latinas have higher rates of suicidal ideation and attempts than do non-U.S.-born Latinas do (Pena et al., 2008; SAMHSA, 2012). In a similar vein, Swanson et al. (1992) found that suicidal ideation, depressive symptoms, and drug use were more frequent among 1,775 Mexican students born in the U.S. than among 2,382 counterparts born and living in Mexico. In additional research with a clinical sample, Zayas et al. (2009) found no differences on an acculturation scale when comparing 65 outpatient Latina girls with recent suicide attempts and their mothers to 75 Latinas without any attempt and their mothers. Finally, Ng (1996) found that among 61 Mexican adolescents admitted to an inpatient unit for attempting suicide, those who scored higher on the Suicide Intent Scale had lived significantly fewer years in Mexico. One explanation for these discrepant results is variability in how acculturation is measured in the literature, with some studies measuring acculturation based on self-report measures, and with others using language, nativity, and number of years spent in the U.S. as a proxy of acculturation (Schwartz, Unger, Zamboanga, & Szapocznik, 2010).

Finally, most studies fail to consider the match between adolescent and parent acculturation. There is evidence that acculturation is higher and more rapid among children and lower and occurs more slowly among parents (Phinney, Ong, & Madden, 2000; Smokowski & Bacallao, 2007; Smokowski, Chapman, & Bacallao, 2007; Szapocznik et al., 1986). Different levels of acculturation between adolescents and their parents, along with the conflicts they generate, have been previously documented (Phinney, Berry, Vedder, & Liebkind, 2006; Smokowski et al., 2007), and associated with substance abuse (Martinez, 2006) and conduct disorders (Breslau et al., 2011; Bird,

Davies, et al., 2006) among Latino families. These findings suggest that parent-youth gap acculturation may take a toll on adolescents and increase their risk of suicidal behavior.

The role of discrimination has been studied as a potential risk factor for suicidal behavior among adults diverse racial/ethnic background. While perceived discrimination has been linked to poor mental health outcomes across different racial/ethnic minority groups (Gee, Spencer, Chen, Yip, & Takeuchi, 2007; Kessler, Mickelson, et al., 1999; Sellers & Shelton, 2003), its association with suicidal behaviors yields contradictory results. Studies with Asian adults found that discrimination was associated with suicidal ideation (Cheng et al., 2010; Hwang & Ting, 2008); other study with African-American emerging adults did not detect a link between racial discrimination and suicidal ideation and attempts (Castle et al., 2011). Studies among Latinos are scarce and there are no studies that we are aware of focused on Latino children and adolescents. Two recent studies have reported on perceived discrimination and suicidal outcomes in two diverse ethnic samples of young adults. In a college sample (34% Asian, 29% white, 17% Latino, 11% Black, 8% other) discrimination measured at baseline was not associated with suicidal ideation at follow up (1-2 years later) (Polanco-Roman & Miranda, 2013). In the other study with ethnically diverse 18- to 29-year-old, perceived discrimination statistically predicted endorsement of a lifetime suicide attempt history (Gomez, Miranda, & Polanco, 2011). Emerging adults are more likely to experience perceived discrimination than older adults (Kessler, Mickelson, et al., 1999; Pérez et al., 2008), further research to shed light on the role of perceive discrimination is needed.

Finally, the relationship between immigration and suicidal behaviors is likely complex and influenced by many factors besides those mentioned above. For example, compared with Mexicans with no personal history of migration to the U.S. and no family

member living there, having a family member in the U.S., being younger than 12 years at the time of immigration to the U.S., and being born in the U.S. increased the risk for suicidal ideation and attempts (Borges et al., 2009).

Early accounts among young Puerto Rican women and adolescents (Trautman, 1961a, 1961b) identified suicide attempts as "suicidal fits". Trautman's description still fits somewhat the suicidal attempts seen in clinical settings today: typically impulsive escapes from stressful situations, often manifested by the ingestion of pills, and are related to disturbances in family relations, typically with a spouse or mother.

Building on this idea, Zayas et al. (2005) proposed a model for studying Latina girls' suicide attempts (Figure 2). Latina girls who attempt suicide are affected by a specific family socio-cultural environment that includes cultural traditions (i.e., *familism*, parent-youth discrepancies in acculturation, *machismo,* shifting in family and sex roles), family functioning (i.e., authoritarian parental style, parent-daughter conflict), and the adolescent development (i.e., need of autonomy). The interaction between these distal factors exacerbates the underlying vulnerability for suicidal behavior. Vulnerability and psychological functioning, plus the adolescent-family crisis are considered as proximal factors (i.e., immediate antecedents and/or precipitants of the SA). By emotional vulnerability and psychological functioning Zayas refers to common risk factors such as MDD, history of sexual abuse, poor coping strategies, or hopelessness. Adolescent-family crisis are the most frequent reasons that Latina girls give as precipitants of their SA versus peer-related stresses, which more commonly reported by non-Latino adolescents. A prolonged and intense family struggle over girl's developing sexuality and greater autonomy combined with her propensity to experience the family conflict as an existential threat to herself may lead her to think in suicide as a reasonable way to extinguish the

situation.

"A family conflict around the adolescent's behavior, operating within a social cultural context that bring into conflict different model of relatedness, coupled with girl's emotional vulnerability and heightened sensitivity to threating the family order, seems to hold the catalytic potential for the SA. Our view of the attempts represents a major developmental struggle between the adolescent's need for autonomy and her deep regard for family that unit comes from the cultural socialization of familims" (Zayas et al., 2005)

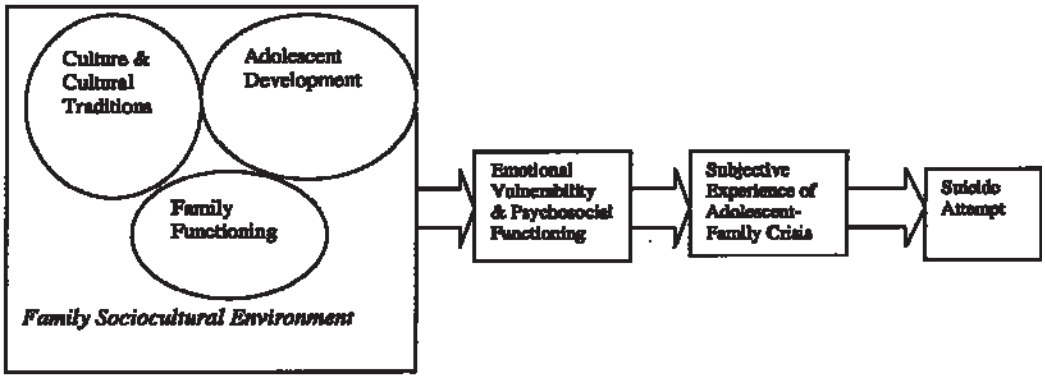


Figure 2. Conceptual model for research on suicide attempts by adolescent Latinas (Zayas et al, 2005) *(Permission to reproduce not required: http://apa.org/about/contact/copyright/index.aspx)*

1.8. Implications for assessment and treatment

The first study contributes to the scarce literature that prospectively explores incidence, persistent and transition between the forms of ideation in a continuum of severity in a representative community sample of Puerto Rican early adolescents living in two contexts: the South Bronx in NY (minority status) and San Juan and Caguas in Puerto Rico (majority status).

Our findings build on the existent literature by highlighting the importance of focusing on the different severity forms of suicidal ideation. Having thoughts about death, people who have died or being dead was a frequent experience among adolescents aged 10-13 years old. It may reflect a developmental stage in which the concept of individual's own death and mortality is acquired (Mishara, 1999), but also it may be an indicator of severe distress and significant risk for suicide, especially at this age when the rates of suicidal behavior start increasing. Although passive ideation seemed to be more transient form than active ideation, reporting passive ideation at the baseline was associated with persistent ideation and transitioning to a more severe form of suicidal ideation within the two subsequent years, thus serving as a sign that warrants attention to prevent future adversity. Thoughts of seriously thinking about killing themselves and having a plan to kill themselves were the most severe markers of risk for endorsing ideation again at follow-up. Given that early onset of ideation has been associate with worse severity in the continuum of suicidality and negative outcomes later in life (Thompson et al., 2012), assessment risk of suicide should include detailed questions for the different SI forms along the continuum of severity, including even the more passive and transient suicide thoughts (Baca-Garcia, Perez-Rodriguez, Oquendo, et al., 2011; Steinhausen & Metzke, 2004; Stoep et al., 2009). The low rates of active ideation and even lower of suicide

attempts in early adolescence provides a window to implement prevention and intervention strategies that curb the progression in the continuum of suicidality, especially among girls, within the first year of the onset of ideation. Moreover, nearly all SA had a concurrent ideation, and for the vast majority active ideation was the more frequent form, suggesting the value of focusing suicide prevention efforts on the ideation, and also supporting the idea of the continuum of suicidality.

The results of the present study highlight some modifiable factors (e.g., depression) that are potential targets for public health interventions aimed at decreasing suicide risk. Mental health professionals need to pay special attention to those early adolescents with anxiety disorders and without suicidal behavior, because they may be at an increased risk for reporting ideation in the near future. It has been suggested that clinicians do not routinely assess risk for suicide in patients with anxiety disorders leading to an underreporting and no identification of possible individual at risk for suicide (Noyes et al., 1991). Once the ideation is present, psychiatric disorders seemed to show a different pattern of association with future ideation, in other works, the clinician should pay attention to different disorders, depending on the severity of ideation form. Specifically, whereas mood disorders were associated with passive ideation, anxiety and disruptive behavior disorders were associated with active ideation at follow-up. Especial attention has to be paid to girls, who showed an increased risk of transitioning to active ideation in the presence of passive ideation, thus to be at higher risk for attempted suicide in the near future.

Further research should focus on exploring specific individual disorders and the comorbid profiles associated with the different forms of ideation, and the mechanisms that

may be underlying the differential link between the psychiatric disorders the forms of ideation.

Last but not least, being a minority group increased the risk for reporting ideation in early adolescents with and without previous suicidal behavior. Compared to white adolescents, Latinos in the U.S. displayed the highest rates of depression and the lowest rates of mental health services, especially for mood and anxiety disorders (Merikangas et al., 2011). Programs that improve the detection of mental health problems in the community and the access to mental health care are needed. Merikangas et al. (2011) suggested that Latino families are frequently unaware or uncomfortable with mental health services that could help prevent or change this unfavorable trajectory of anxiety disorders in emerging adulthood. However, in the rare instances that treatment or prevention strategies were tailored to the needs, concerns, and values of these families, positive outcomes were achieved (Miranda et al., 2003; Prado et al., 2007). Based on Garcia Coll's model, social position factors, such as race, ethnicity, and minority status, affect children developmental from a macro-level perspective. It is though other mechanisms, such as racism and oppression that social position operates in environments that affect children development more directly. Further research should continue to disentangle the distal and proximal mechanisms that may explain the impact of minority status on the continuum of suicidality.

1.9. Strengths

Suicidal behavior is a low rate behavior so it requires large sample sizes to be understood in community populations. The large sample size of the present study, the inclusion of early adolescents, the prospective-longitudinal design, and high compliance

rate at follow-up were some of this study's main strengths. Suicidal ideation in the Boricua Youth Study (BYS) was assessed annually starting at the age of 10-13, when suicidal behavior sharply increases, providing with a distinctive scenario to explore the progression. Moreover, the unique design of the BYS, allowed the comparison between of the same ethnic group in two contexts varying in minority status (the South Bronx, NY and Puerto Rico).

More strengths of the study were the use of a validated interview for the assessment of DSM-IV psychiatric disorders and specifically validated for the assessment of suicidal behavior (King, Katz, et al., 1997), and the use of multiple informants.

1.10. Limitations

Our findings, however, have to be evaluated in the context of several limitations. First, we did not have measures of lifetime ideation, so we cannot talk about of first- onset of ideation, but incidence. Second, although the sample in Puerto Rico can be considered to represent urban children on the island, the sample in the SB is not representative of Puerto Rican children throughout the United States. Therefore, although the SB sample is probably typical of populations of Puerto Rican migrants in other urban centers in the United States, the findings from this study warrant further replication in other settings and with other cultural groups. Fourth, only a relatively small fraction of the sample had arrived at mid-adolescence, the age in which there is heightened risk for suicide attempts. The small rates of suicide plans and attempts even by the third wave limits our ability to further explore the association between the forms of ideation and psychiatric disorders with the serious ideation, suicide plans, and suicide attempts separately, and guarantee the interaction effects were not artifacts due to the small power of the analyses. Most of the

adolescents who attempted suicide also reported serious ideation and suicide plans in the same year. Further research is needed to clarify how much of association of anxiety and disruptive behavior disorders with active ideation may be explained by the presence of a suicide attempt.

Discussion – Study 2[3]

2.1. Rates of suicidal behavior

2.2. Association of the characteristics of suicidal ideation with future SA

2.3. Transition from ideation to attempt

2.4. Implications for assessment and treatment

2.5. Strengths

2.6. Limitations

This is the first study of which we are aware to prospectively examine whether the specific characteristics of suicidal ideation assessed by questions used to screen for suicidal ideation predict whether adolescents will make a future SA, beyond diagnosis and history of a previous SA. It is also the first study of which we are aware to examine specific SI characteristics associated with a future attempt among adolescents who were interviewed about their suicidal ideation.

The main findings suggest that endorsement of recent suicidal ideation (past 3 months) on a screening questionnaire at baseline, along with frequency ("Have you *often* thought about killing yourself?"), seriousness ("Have you thought *seriously* about killing yourself?"), and duration of ideation (Have you thought about killing yourself *for a long time?*), were associated with increased risk of making a SA during a follow-up period. Among a subsample of ideators adolescents who were interviewed about their suicidal ideation at baseline, longer length of ideation of a typical ideation episode significantly predicted a future attempt. Finally, preliminary evidence suggested that adolescents whose

[3] Extended version of Discussion extracted from: *Miranda R., **Ortin** A., Scott M., Shaffer D. (2014). Characteristics of suicidal ideation that predict the transition to future suicide attempts in adolescents. Journal of Child Psychology and Psychiatry, Vol. 55(11), p. 1288–1296 (Appendix)*

ideation lasted one hour or more made their attempt, on average, within one year of their baseline interview.

2.1. Rates of suicidal behavior

The Columbia Suicide Screen (CSS) was administered between 1991 and 1994. Of the total sample of 1,729 adolescents (aged 11 to 21 years), 190 (11%) thought about suicide in the past 3 months and 108 (6%) attempted suicide in the past. As a reference, in the YSRB published in 1995, early one fourth (24.1%) of nationwide students had seriously considered attempting suicide, 17.7% of students had made a specific plan to attempt suicide, and 8.7% of students had actually attempted suicide during the 12 months preceding the survey.

The sample of our report is a subsample of the 1,271 students who completed the teen screen (Shaffer et al., 2004). Those who were considered a positive-screen were sampled at twice the rate of those who were a negative-screen for risk, and for this methodological reason the rates of reported suicidal behavior in the subsample of the present study were so high. At baseline, the rate of suicidal ideation in the last 3 months was 29.4% (n = 149) and of lifetime SA was 17% (n = 86). Of the 149 ideators at baseline, 17.4% made a future SA and of the 86 with lifetime SA, 24.4% reattempted at follow up. The most frequent method was through ingestion (55%), followed by a cutting instrument (17%), a gun (12%). Overdose seems to be consistently the most frequent method for attempting suicide among adolescents especially among girls. In two impatient adolescent samples, Kienhorst et al. (1995) found that 2/3 of the attempters took an overdose of medicine or toxic substances and Negron et al. (1997) reported a rate of overdoses of 88%.

Neither age, gender or ethnic/racial group differed between those who attempted at follow-up and did not. Only psychiatric disorders, mood and anxiety disorders, were associated with future SA. However none of the disorders remained significantly associated with future SA once entered in the full model with the suicidal ideation questions and past history of SA. Only history of SA at baseline was associated with future SA above and beyond the SI questions.

Of the subsample of ideators only (n = 97), 12% transitioned to first time SA, and 41% reported thinking about suicide only in the past year. Ingestion was the most frequent method of SA (75%). There were no significant differences by age, gender, and race/ethnicity. Among this subsample of ideators, psychiatric disorders at baseline among those who made a future attempt, expressed ideation only, or who did not endorse any suicidality at follow up.

2.2. Association of the characteristics of suicidal ideation with future SA

Our results support previous findings that endorsing recent suicidal ideation at one time point is associated with future SAs (Lewinsohn et al., 1994; Reinherz et al., 2006; Thompson et al., 2012; Wichstrom, 2000). However, not all the characteristics of the ideation seem to predict a future SA equally. We found that among those adolescents who reported suicidal ideation in the last 3 months versus those without ideation, having often thoughts about killing yourself (frequency) increased the risk for future SA above and beyond gender, psychiatric diagnoses, history of SA and the other SI characteristics (currency, seriousness and duration). Among ideators (with and without history of SA at baseline), length of a typical ideation episode was associated with an increased risk for future SA. Among the subsample of ideators without history of SA at baseline, also wish

to die (being uncertain or wanted to die vs. not wanted to die) also was associated with future SA. These data are also consistent with Negron et al.'s (1997) finding that adolescent attempters reported greater length of suicidal ideation during their suicidal episode, compared to ideators, and also with Miranda et al.'s (2014) finding that adolescent attempters who reported longer suicide planning (1 hour or more) leading up to their most recent SA were at greater risk for a future attempt, compared to adolescents whose attempts were more impulsive. Interestingly, these findings are in contrast to a recent retrospective study with adults that found that among individuals whose first onset of suicidal ideation was at about age 26, recurrence of suicidal ideation was associated with lower odds of a suicide attempt (Ten Have et al., 2013). In studies with adult samples, history of suicidal ideation, even recurrent, but not acting on it, transitioning to plan or suicide attempt, seems to be a protective factor (Borges, Angst, et al., 2008; Ten Have et al., 2013). However, this study did not measure length of suicidal ideation. Perhaps among individuals who have not thought about suicide by adulthood, persistence of ideation may be protective against a suicide attempt. However, when suicidal ideation occurs as early as adolescence, it enhances risk of a suicide attempt (Thompson et al., 2012). Alternatively, a 10-year follow-up study of a nationally representative sample of 15-54-year-olds found that a baseline history of suicidal ideation without a plan was associated with decreased risk for a future suicidal plan, but having a history of making a previous suicide plan increased the odds of making future suicidal plans (Borges, Angst, et al., 2008). Thus, when it comes to long-term risk, it may not merely be the presence of suicidal ideation, but the seriousness of suicidal ideation that enhances risk for future suicidal behavior. The more time since the last report of ideation passes, the less probability to report ideation again (Kerr, Owen, & Capaldi, 2008; Kerr, Owen, Pears, et al., 2008).

One unexpected finding was that currency of ideation (i.e., whether adolescents endorsed that they were *still* thinking about killing themselves) was associated with lower odds of a future SA in a full model that included all variables. This finding should be interpreted with caution, however, because endorsement of current ideation was only associated with lower odds of a future SA after adjusting for the other ideation characteristics, suggesting that the findings may be due to the correlations among the questions (i.e., the correlations between currency of ideation and frequency, seriousness, and duration of suicidal ideation were .47, .51, and .39, respectively).

2.3. Transition from ideation to attempts

Among ideators with and without history of SA at the baseline assessment, thinking about suicide for 1 hour or more was associated with an earlier transition to attempters within the subsequent year. For those who thought about suicide for less than one hour, the transition occurred 2-3 years later. In fact, just among ideators, this effect was more evident. Given that the risk of transition mostly happened during the first year since the onset of ideation (Nock et al., 2013), these preliminary data shed light on the factors that may determine the transition from thought to action.

Although almost 40% of the ideators at the baseline assessment reported suicidal ideation again during the follow up period, none of the characteristics of the ideation were associated with persistent ideation. One explanation for this finding is that ideation at follow-up was not measured since baseline, but within the year before the follow-up interview. In addition, this included ideation only; those who attempted during the follow up period were excluded from this group.

2.4. Implications for assessment and treatment

This study suggests that screenings for adolescent suicide risk should not only inquire about suicidal ideation, but also about how seriously, how often, and for how long adolescents have thought about suicide. Furthermore, adolescents with recent ideation may be at risk of transitioning to an attempt if they ideate for a long time (i.e., 1 hour or more). Assessments should thus inquire about these specific ideation characteristics. These characteristics may also serve as targets for intervention. For instance, treatment with adolescents who present with suicidal ideation should focus on techniques that may decrease the length of their ideation (e.g., addressing distress tolerance, problem-solving, and mindfulness). In addition, interventions might also incorporate suicide safety plans (Stanley & Brown, 2012) for adolescents who report greater frequency or length of their suicidal ideation and even distress safety plans for those with undisclosed current suicide premeditation (Bagge, Littlefield, & Lee, 2013).

At the same time, the wording of the inquiry is important. Endorsement of a question about SI duration on the CSS (e.g., "*Have you thought about killing yourself for a long time?*") was a less robust predictor of a future SA than the actual length of adolescents' most recent suicidal ideation. Therefore, inquiries about SI duration should be specific and focus on length.

2.5. Strengths

Strengths of this study include the racially and ethnically diverse community sample that was followed up over time, the assessment of multiple characteristics of suicidal ideation, the adjustment for psychiatric diagnosis, and the high rate of follow-up assessment (75–79%).

2.6. Limitations

There are a number of limitations. First, our assessment of SI characteristics was retrospective and consequently subject to recall bias. Second, our assessment of a SA at follow-up was based on responses to two questions on a telephone interview (i.e., whether participants had ever made a SA and whether it had been made since the baseline interview). Third, timing of the most recent attempt was determined by the difference between the participant's age at baseline and the age they reported being at their most recent attempt during the follow-up period. Thus, it was only precise down to years. Fourth, despite the fact that the present study inquired about characteristics such as "seriousness" or length of suicidal ideation, it did not inquire about specific features of suicide planning, such as whether adolescents considered how, when, and where they would make an attempt. While it might be inferred that adolescents who reported a greater length of ideation were more likely to have a detailed plan, future research should specifically inquire about these characteristics. Finally, seven of the 18 adolescents who reported an attempt at follow-up assessment made more than one attempt, and for this reason we did not have information on the timing of their first attempt.

3. Final Comments

Notwithstanding the limitations of both studies, the present dissertation makes important contributions to the literature on suicidal ideation and has a number of implications for prevention, intervention and future research that are being discussed in this section.

Our main finding was that although suicidal ideation predicted future suicidality independently of gender, psychiatric disorders, past SA, and other risk factors considered, not all the severity forms or characteristics of the ideation heighted the risk in the same way. Specifically, the more severe - *active ideation* - and the more frequent the ideation - thinking *often* about suicide - the higher the risk of future suicidality. Also and among ideators, the longer the length of the suicidal episode - *thinking about suicide for 1hr. or more* - the higher the risk for future attempts. Moreover, *length* of the ideation episode was also linked to an earlier transition to attempter among ideators. Other characteristics such as *currency* or *wish to die* were not associated with attempted suicide during the follow-up period.

Another significant finding was that specific psychiatric disorders were differently associated with suicide risk depending on the severity of the ideation. Mood disorders predicted only passive ideation, whereas anxiety and disruptive behavior disorders were only associated with active ideation when controlling for past-year SI and SA at baseline, minority status, gender and socio-economic risks. Finally, among adolescents without suicidal behavior at baseline, minority status and anxiety disorders were associated with reporting any form of ideation in the two subsequent years.

Our results are strengthened by the longitudinal and prospective study designs that allowed us to establish temporal relationship between the risk factors at baseline and the suicide-related outcomes.

In the present section, we are going to discuss the following points:

3.1. Theoretical models
3.1.1. Fluid Vulnerability Theory
3.1.2. Interpersonal-Psychological Theory of Suicide
3.2. Final comments clinical implications and future directions

3.1. Theoretical models

Our findings might be understood in light of prevailing theories of suicide.

3.1.1. Fluid Vulnerability Theory

The Fluid Vulnerability Theory (FVT) (Rudd, 2006) posits that individuals can establish a vulnerability to future SAs through experience, like having a history of previous SI or SAs. This model helps to understand the onset and persistence of suicidal behavior, why people become suicidal and continue with this behavior once they engage in it and how probable is to have another episode. It argues that the onset of episodes of risk is due to an acute activation of the *suicidal mode*. The *suicidal mode* is a state of suicidality that has four systems that work in synchrony when the suicidal mode is triggered by an internal (e.g., feeling, image, thought) or external (e.g., loss of a relationship) precipitant. The four systems are: 1) the suicidal belief (cognitive) system, 2) the affective system, 3) the physiological system, and 4) the behavioral (motivational) system. The result of the activation of these systems is a risk state or episode characterized

by a core of cognitive themes (i.e., helplessness, poor distress tolerance, etc.), acute dysphonia and related psychological arousal, and associated death-related behaviors. This episode of acute suicidality is limited in time, because the imminent risk cannot endure beyond periods of heightened arousal.

FVT proposes that each person has a baseline vulnerability to the activation of the suicidal mode that is determined by historical and developmental factors and extends across domains (e.g., impaired problem solving, physiological and affective symptoms, deficit interpersonal or self-soothing skills…). This baseline vulnerability defines why someone might become suicidal under a given set of conditions or, on the other hand, never even consider suicide as an option

The onset and severity of the suicidal episode depends on the interaction between baseline vulnerability to trigger the *suicidal mode* and the severity of the precipitant stressors, and resolves when the precipitants are effectively targeted and the person returns to the baseline risk level. However, once the *suicidal mode* has been activated once, the threshold of activating a subsequent episode gets reduced. In short, repeated suicidal states results in *a suicidal mode* that is easily triggered. This threshold may be lowered by previous SAs (Joiner, Rudd, Rouleau, & Wagner, 2000) and/or the length of suicide planning (Bagge, Glenn, & Lee, 2013). Our data support the possibility that longer duration of SI contributes to establishing vulnerability to SAs.

3.1.2. Interpersonal-Psychological Theory of Suicide

The present findings might also be interpreted through Joiner's Interpersonal-Psychological Theory of Suicide (Joiner, 2005). According to this theory, when individuals simultaneously hold two specific psychological states (*a sense of low*

belongingness or social alienation and perceived burdensomeness) for a long time, they will develop the *desire for death*. A *low sense of belongingness* is the experience that one is alienated from others, not being a part of a family, circle of friends, or other valued group. *Perceived burdensomeness* is the view that one's existence burdens the family, friends, and/or society and produces the idea that *"death is worth more than life to them"*.

This theory proposes that while feelings of burdensomeness and low belongingness may instill the *desire for suicide*, they are not sufficient to ensure that desire will lead to a suicide attempt. Indeed, in order for this to occur, a third element must be present: the *acquired ability for suicide*. In short, suicide risk will be a function of how seriously the individuals want to die combined with how much they have *acquired the capability for suicide*.

In relation to the *acquired capability of suicide,* the theory suggests that suicide implies a struggle with the need of self-preservation. Having to face this battle repeatedly and in different domains instills the capacity to diminish the self-preservation need. The basis for this proposition rests on the opponent-processes theory (Solomon, 1980). This theory suggests that with repeated exposure to an affective stimulus, the reaction to that stimulus shifts over time, such that the stimulus loses its ability to elicit the original response strengthening the opposite response.

In light of Solomon's theory, Joiner posits that the *capability for suicide* is acquired through repeated exposure to painful or fearsome experiences. This repeated exposure to salient experiences results in habituation and a sense of fearlessness in the face of death and a higher tolerance for pain. This capability is viewed as a continuous construct that evolves over time and it is influenced by the nature of those experiences;

such that, the more painful and provocative the experiences, the greater capacity for suicide.

Van Orden et al., (2010) propose four hypotheses within the *Interpersonal-Psychological Theory of Suicide*. The theory's first hypothesis is that *low belongingness* and *feelings of burdensomeness* are proximal and sufficient cause to experience passive suicidal ideation ("*I wish to die"* or *"I would be better of death*") (Hypothesis 1). In order for this passive desire transition to active ideation, the person must perceive his/her levels of burdensomeness and belongingness as unchanging and permanent, in other works, the person must be hopeless about his/her perceived mental interpersonal status (Hypothesis 2). Suicidal intent is conceptualized as the level of suicidal desire that is most likely to translate into behavior. The third hypothesis posits that in order to possess suicidal intent, the individuals must have habituated to the fear involved in suicide to the extent that they are able to plan, or decide to engage in, the suicidal act. This, suicidal desire will transform into suicidal intent on the presence of lowered fear of death. The final hypothesis (Hypothesis 4) entails that the suicide attempts will happen in the context of suicidal intent, reduced fear of suicide, and elevated physical pain tolerance that allow the person to endure the pain involved in dying by suicide, that is when the person has acquired capability of suicide.

The *acquired capacity for suicide* is accumulated over time through repeated experience of painful and fear-inducing experience, which may become less frightening as well as a source of emotional relief, lowering the threshold for engaging in those experiences again.

According to this theory, there are different ways to acquire the *capability of suicide*. First, engaging in suicidal behavior will be the most direct route and most potent

way to habituate individuals to the pain and fear of self-injury, increasing suicide risk. Second, other less potent pathways that activate habituation and opponent-processes will be childhood maltreatment and combat exposure. Third, aside from direct exposure, the theory also suggests that even exposure to others' pain and injury may produce the capacity for suicide. Forth, the personality trait impulsivity is also proposed as a pathway to acquire this capability. Impulsive and/or aggressive individuals are more likely to engage in provocative experiences (e.g., drugs consumption, physical fights, promiscuous sex, jumping from high places, hurting animals intentionally, etc.) that, through repetition, will result in the development of pain tolerance and lower fear of death. Finally, spending a lot of the time planning an attempt (i.e., engaging in mental practice) is also a way to habituate to the fear associated with making a suicide attempt.

To sum up, the theory posits that the *joint* occurrence of failed belongingness and perceived burdensomeness is necessary to produce the desire to die, but this desire translates into a lethal action or behavior *only* in the presence of the acquired capacity for suicide.

Our findings support the idea that suicidal ideation is a risk factor for future ideation and attempts; specifically, the more severe the ideation and the longest the suicidal episode, the higher the risk of attempting suicide. Time spent thinking about suicide and planning how to kill oneself may serve as a form of practice for future suicidal behavior, contributing to this acquired ability.

Finally, if disruptive behavior disorders are considered indicators of high levels of poor self-control and impulsive or aggressive tendencies (Gould et al., 2003), this theory serves to understand why psychiatric disorders are related to suicide risk at different levels. While internalizing pathology (e.g. depressive symptoms) will confer a potential

risk for suicidal ideation, externalizing pathology (e.g. behavioral problems) may ultimately determine youth engagement in suicide attempts.

"Suicide ideation is a frequent precursor to suicide attempts, but is much more likely to 'progress' to actual behavior in the presence of impulsive aggression" (Bridge, 2006)

3.2. Final comments: clinical implications and future directions

Adolescent suicidal ideation is the main topic discussed in this dissertation. The meaning of thoughts about death and suicide during early adolescence is not always clear, it is difficult for parents, teachers, and care providers to accurately determine the degree of an adolescent's suicide risk and, in turn, to plan an appropriate response that will assure safety. For this reason it not only it is important to know whether the adolescents are thinking or not about suicide, but also what it is in their minds when they are thinking about suicide and how those thoughts evolve over time, in a way that may increase or decrease the suicide risk.

This dissertation aims to help clarify the heterogeneity and complexity of the adolescent suicidal mind. The first study focused on the progression of the suicidal thoughts along a continuum of severity (i.e., passive ideation, serious ideation, and suicide plans), to explore their incidence, persistence and transition of forms of ideation, as well as to identify the different risk factors associated with the progression along this continuum over 3 consecutive waves of assessment. The second study examined the prospective association between the characteristics of ideation and future risk of attempting suicide over a 4-6-year follow-up period, in a sample of high school students first, and then in a subsample of adolescents with recent suicidal ideation at baseline.

These studies make a number of contributions to the literature and have some implications for intervention and future research.

The first study contributed to the small extant literature that prospectively explores suicidal behaviors among minority children. Specifically, it addressed the incidence, persistent and transition along a continuum of severity of ideation in a community sample of Puerto Rican early adolescents living in two contexts, varying in minority status (the South Bronx, NY and Puerto Rico). Adolescent were 10 to 13 years old at wave 1, age in which the rates of suicidal behavior sharply increase, reaching to the highest rates throughout the life span (Nock et al., 2013; Borges, Benjet et. al, 2008). The main findings were, first, one-third of the adolescents with passive ideation and two-thirds of those with active ideation at wave 1 reported ideation in the follow-up period (waves 2 and/or 3). Both forms of ideation, especially active ideation, predicted ideation in the subsequent two years independently of the minority status, gender, psychiatric disorders and past-year SA at wave 1. Second, among those adolescents without any suicidal behavior at wave 1, those with anxiety disorders and minority status (living in the South Bronx) had higher odds of reporting ideation at follow-up over and above gender and psychiatric disorders. Third, psychiatric disorders had a differential impact on the continuum of SI severity when ideation at baseline was considered. Specifically, mood disorders were only associated with passive ideation, whereas anxiety and disruptive behavior disorders were only linked to active ideation at follow-up. Minority status was associated with reporting both forms of SI at follow up independently of baseline ideation, gender, psychiatric disorders and past-year SA. Finally, we found that in our sample of early adolescents, gender was not associated with reporting any form of SI in the follow-up period.

Similarly to the risks associated with early onsets among mental health conditions, early thoughts of death seem to presage a worse severity in the continuum of suicidality in upcoming years and, as the literature suggests, a greater likelihood of negative psychological and socio-economic outcomes in adulthood (Reinherz et al., 2006; Steinhausen & Metzke, 2004). This study indicates that the number of early adolescents who had passive suicidal ideation that persisted over time is sufficient to merit concern and opens a window for early detection and implementation of prevention strategies. Earlier identification and intervention on anxiety, mood, and disruptive behavior disorders are important components of the prevention and treatment of youth suicidal behavior. Mental health professionals should paid especial attention to those adolescents without any suicidality but with anxiety disorders, when the rates of mood disorders are still very low, because they may be at risk of starting suicidal ideation in the subsequent years. Further research should focus on understanding the mechanism that may explain effect of minority status on suicide. Based of Garcia Coll's model and the literature on suicide risk, some of the potential mechanisms could be discrimination, acculturation, quality, access and utilization of mental health services, exposure to violence, and parent-adolescent conflict.

Our data suggested that girls with passive ideation had higher odds of transitioning to active ideation at follow-up compared to boys. Further replication of our findings is needed, especially of the interactions effects.

The second study is the first, of which we are aware of, to prospectively identify specific characteristics of suicidal ideation that predict a future SA among adolescents independently of psychiatric diagnosis and previous SA history. We found that among those adolescents who endorsed SI on the teen screen and responded affirmatively to

thinking about suicide *often*, *seriously*, and *for a long time* had higher odds of attempting suicide. However, only thinking *often* was significantly linked to higher odds of a future SA when also adjusting for currency, seriousness, and duration, psychiatric diagnosis and previous SA history. A subsample of 122 adolescents who endorsed SI at baseline (97 without any suicidal behavior at baseline) also completed a detailed interview about their most recent SI. Ideating for 1 hour or more (vs. less than 1 hour) was associated with a future SA and it was also associated with making a future SA earlier. In addition to making inquiries about whether a teenager has experienced recent suicidal ideation, these data suggest that screening for suicidal ideation should inquire about whether adolescents have *often* and *seriously* thought about killing themselves. Further, length of a typical ideation episode is informative about their likelihood of transitioning to a future SA and also the timing of that transition. Thus, clinicians should also inquire about length of adolescents' recent ideation, as a SI episode lasting an hour or more may substantially increase their risk of making an attempt. As we highlighted before, more care has to be place on the specific content of the questions when asking about suicidal ideation. Moreover, different questions may elicit different answers, therefore different rates of ideation, especially in children who are specifically susceptible to the wording and timeframes of questions.

Nowadays, few psychological interventions are effective in the long-lasting reduction of suicidal behavior in adolescents (Ougrin, Tranah, Stahl, Moran, & Asarnow, 2015; Tarrier, Taylor, & Gooding, 2008). The vast majority of those interventions mainly focus on addressing distal and proximal risk factors for suicidal behavior, such as depression (Asarnow et al., 2011; Brent et al., 2009; Spirito, Esposito-Smythers, Wolff, & Uhl, 2011; Stanley et al., 2009), emotional dysregulation or distress tolerance (Canadian Agency for & Technologies in, 2010; Rossouw & Fonagy, 2012), substance use (Esposito-

Smythers, Spirito, Kahler, Hunt, & Monti, 2011), and familial problems (Diamond et al., 2010; Huey et al., 2004), with the view to reduce suicidal behavior as a secondary effect. Other interventions, such as the Safety Plan, aim to identify and implement strategies that adolescents can undertake when they experience any suicidal or harming thoughts (Stanley & Brown, 2012). In a review of CBT-based interventions, Tarrier et al. (2008) noticed that the treatments were more effective when directly focused on reducing some aspects of the suicidal behavior than when addressed other symptoms, such as depression, with the secondary aim to reduce suicidal behavior. Another limitation on the design of the clinical trials, directly drawn from our findings, would be that researchers usually do not take into account either the different levels of severity of suicidal behavior or the characteristics of the ideation when designing the intervention, thus adolescents with any suicidal behavior received the same treatment modality. We hypothesize that these limitations might be underlying the absence of significant and lasting effects of the interventions on the reduction of suicidal behavior.

A step forward in this line of research would be to identify profiles of ideators, combining the different levels of severity and the characteristics of the ideation, to more accurately capture the phenomenology of suicidal thoughts and behaviors. For example two adolescents classified as ideators by a suicide screen or in terms of eligibility for a clinical trial can show completely different profiles of ideation. One may be experiencing long-lasting but infrequent episodes of ideation, characterized by active planning, and triggered by external precipitants; whereas the other teen may be experiencing multiple daily but brief episodes of passive ideation, internally or automatically triggered. Probably, these two teens will require different level of monitoring and different strategies specifically tailored to reduce their suicide ideation based on its specific level of severity and characteristics (e.g., decreasing the intensity and/or the duration of the suicidal

episode).

In summary, our findings build on the existent literature on suicidal ideation as risk factors for future suicidality by focusing on the progression along a continuum of severity and identifying the characteristics of suicidal ideation that best predict future SA. The line of research presented in this dissertation is a promising area of research with important clinical implications because it may facilitate the identification of those adolescents at higher suicide risk, improve the utilization of different levels of care (e.g., adolescents with suicidal episodes of 1 hour or more should be identify to be at higher risk for suicide attempts than those with shorter episodes), and lead to the design of therapeutic interventions that directly target each adolescent's content and characteristics of the suicidal ideation that he or she is experiencing.

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Acknowledgements Journals

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Appendix

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Characteristics of suicidal ideation that predict the transition to future suicide attempts in adolescents

Regina Miranda,[1,2] Ana Ortin,[1,3] Michelle Scott,[4] and David Shaffer[1]

[1]Division of Child and Adolescent Psychiatry, College of Physicians and Surgeons, Columbia University, New York, NY, USA; [2]Department of Psychology, Hunter College, City University of New York, New York, NY, USA; [3]Department of Psychiatry and Forensic Medicine, Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain; [4]School of Social Work, Monmouth University, West Long Branch, NJ, USA

Background: The present study sought to examine characteristics of suicidal ideation (SI) that predict a future suicide attempt (SA), beyond psychiatric diagnosis and previous SA history. **Methods:** Participants were 506 adolescents (307 female) who completed the Columbia Suicide Screen (CSS) and selected modules from the Diagnostic Interview Schedule for Children (C-DISC 2.3) as part of a two-stage high school screening and who were followed up 4–6 years later to assess for a SA since baseline. At baseline, participants who endorsed SI on the CSS responded to four questions regarding currency, frequency, seriousness, and duration of their SI. A subsample of 122 adolescents who endorsed SI at baseline also completed a detailed interview about their most recent SI. **Results:** Thinking about suicide *often* (OR = 3.5, 95% CI = 1.7–7.2), *seriously* (OR = 3.1, 95% CI = 1.4–6.7), and for a *long time* (OR = 2.3, 95% CI = 1.1–5.2) were associated with a future SA, adjusting for sex, the presence of a mood, anxiety, and substance use diagnosis, and baseline SA history. However, only SI frequency was significantly associated with higher odds of a future SA (OR = 3.6, 95% CI = 1.4–9.1) when also adjusting for currency, seriousness, and duration. Among ideators interviewed further about their most recent SI, ideating 1 hr or more (vs. less than 1 hr) was associated with a future SA (OR = 3.6, 95% CI = 1.0–12.7), adjusting for sex, depressive symptoms, previous SA history, and other baseline SI characteristics, and it was also associated with making a future SA earlier. **Conclusions:** Assessments of SI in adolescents should take special care to inquire about frequency of their SI, along with length of their most recent SI. **Keywords:** Suicidal ideation, suicide attempt, adolescence.

Introduction

Suicidal ideation (SI) and suicide attempts (SAs) are more prevalent in adolescence than at any other time of life. Among 13–18-year-olds, lifetime prevalence of SI and attempts are approximately 12.1% and 4.1%, respectively, with rates of SAs three times higher among girls than among boys (Nock et al., 2013). However, the rate of completed suicide among adolescents is low, at approximately 0.005% per year, with the rate among boys three times higher than among girls (Centers for Disease Control and Prevention, 2013). SA history, which predicts future suicidal behavior, has been a previous target of study (Goldston et al., 1999; Hultén et al., 2001; Lewinsohn, Rohde, & Seeley, 1994; Wichström, 2000). However, over half of suicides among adolescents are first-time attempts (Brent, Baugher, Bridge, Chen, & Chiappetta, 1999; Shaffer, Gould, et al., 1996), suggesting that only studying adolescents who have already made SAs misses a substantial proportion of adolescents at risk for suicide. Given its rarity in adolescence, predicting suicide death is a major challenge. However, we may obtain clues to specificity by investigating characteristics of SI that predict future attempts.

Retrospective assessments of adults and adolescents suggest that transitions from SI to attempts occur within a year of onset of SI (Kessler, Borges, & Walters, 1999; Nock, Hwang, Sampson, & Kessler, 2010; Nock et al., 2008, 2013), but how this transition occurs is unanswered. Typically studied risk factors such as psychiatric diagnosis (e.g., major depression) are more strongly related to the presence of SI than they are to the transition from ideation to plans and attempts (Kessler et al., 1999; Nock et al., 2008, 2010). However, adolescent SI predicts future SAs (Reinherz, Tanner, Berger, Beardslee, & Fitzmaurice, 2006), even after adjusting for psychiatric diagnosis (Czyz & King, in press; Prinstein et al., 2008). Reinhertz et al. found that adolescents who reported SI at age 15 had almost 12 times higher odds of having made a SA between ages 15 and 30, compared with adolescents who did not endorse SI at baseline, with no gender differences in this relation (Reinherz et al., 2006). Prinstein et al. found that the reemergence of ideation 9–18 months after discharge from hospitalization predicted a SA during the same time period among adolescent inpatients (Prinstein et al., 2008). In a study of 376 adolescents who were followed up over 12 months following hospitalization for acute SI or an attempt, Czyz and King (in press) found that adolescents whose SI was consistently elevated over the course of the follow-up had over two times higher odds of making a future SA relative to adolescents whose SI declined over the course of follow-up. Careful study of SI characteristics may yield better information about which adolescents are at risk for making future SAs, beyond focusing on

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diagnosis or on adolescents who have already attempted suicide.

Studies of adolescent SI have focused on endorsement of *any previous* SI as predictive of a future SA (Lewinsohn et al., 1994; l; Reinherz et al., 2006; Thompson, Kuruwita, & Foster, 2009; Wichström, 2000) or have examined changes in summary scores on a SI scale (Czyz & King, in press; Lewinsohn, Rohde, & Seeley, 1996; Prinstein et al., 2008), with the assumption that these scales accurately characterize the nature of SI, but without empirical data to support which characteristics of ideation contribute to a future SA. The few studies that have focused on specific SI characteristics (e.g., planning, wish to die) have studied it in the context of an attempt (Miranda, De Jaegere, Restifo, & Shaffer, 2014; Negron, Piacentini, Graae, Davies, & Shaffer, 1997; Roberts, Roberts, & Chen, 1998). One cross-sectional study that compared 32 adolescents who presented to an emergency department with SAs with 35 adolescents who presented with SI found that attempters experienced longer duration of ideation, but no difference in seriousness of their wish to die (Negron et al., 1997). A study of a community sample of 54 adolescent suicide attempters, ages 12–18, who were interviewed about their most recent SA found that planning an attempt for 1 hr or longer (vs. less than an hour) and having a serious wish to die at the time of the attempt were associated with over five times higher odds of making a repeat SA within a 4–6-year follow-up period (Miranda et al., 2014). We know of no prospective study in adolescents that characterized the nature of SI among adolescents who went on to make attempts, a gap in knowledge that the present study sought to address.

We examined the characteristics of SI that would prospectively be associated with risk for a future SA. First, we examined whether different forms of inquiry on a screen for SI would differentially predict risk for a SA over a 4–6-year follow-up period among 506 high school students. Next, we examined whether there would be specific features of SI that would best predict a future attempt among a subsample of 122 adolescents who endorsed SI and who were interviewed in further detail, at baseline, about their most recent SI.

Method

Participants and procedure

Participants were 506 adolescents, ages 12–21 (M = 15.6, SD = 1.4), who took part in a two-stage screening of seven high schools in the New York City metropolitan area (see Shaffer et al., 2004; for a summary of recruitment and consent procedures for the screening) and who also provided data as part of a 4–6-year follow-up study. The schools were chosen to represent different types of schools in the New York City metropolitan area and consisted of six urban and one suburban school (including two single-sex parochial schools and one vocational school). Demographic characteristics of the sample are presented in Table 1. At baseline, 1729 high school students completed the Columbia Suicide Screen (CSS), with a reported SI prevalence (past 3 months) of 11% and lifetime SA prevalence of 6% among respondents (Shaffer et al., 2004). Six hundred forty-one of these individuals, oversampled for a history of SI or SA, were selected to complete the mood, anxiety, and substance use modules of the Computerized Diagnostic Interview Schedule for Children (C-DISC), version 2.3 (Shaffer, Fisher, et al., 1996). Details about selection procedures can be found elsewhere (Shaffer et al., 2004). Participants who endorsed SI during any stage of the screening were also eligible to be interviewed about their most recent SI via the SI module of the Adolescent Suicide Interview (ASI-SI; see below).

Adolescents were contacted by telephone 4–6 years later (M = 5.1, SD = 1.0) and, after providing informed consent (or parental consent with child assent for minors), took part in an interview in which they were asked whether they had made a SA since the baseline interview. Five hundred six (79%) individuals from the larger sample of 641 adolescents provided this information (Forty-six additional adolescents took part in the follow-up study, but did not provide information about their SAs). Of these 506 adolescents, 163 individuals had reported SI at baseline – 149 on the CSS (assessed for the previous 3 months) and an additional 14 on the C-DISC (assessed for the previous 6 months), and 122 of these 163 adolescents had also completed the ASI-SI at baseline. Final sample selection is depicted in Figure 1. There were no statistically significant differences in age, sex, race/ethnicity, and diagnosis among participants who did and did not take part in the follow-up.

Materials and consent procedures for the baseline study were approved by the Institutional Review Boards of the New York State Psychiatric Institute, the New York City Board of Education, and the Archdiocese of New York, and the follow-up study was approved by the Institutional Review Board at the New York State Psychiatric Institute.

Measures

Columbia suicide screen. Two suicide-related questions (with 'yes' vs. 'no' response choices) were embedded within a larger, 32-question health survey. The questions were: (1) 'Have you ever tried to kill yourself?' and (2) 'During the past 3 months, have you thought about killing yourself?' Test–retest reliabilities (κ) for these questions were .48 and .58, respectively (Shaffer et al., 2004). Participants who endorsed SI were asked four additional yes/no questions: (1) 'Are you still thinking about killing yourself?' (currency); (2) 'Have you often thought about killing yourself?' (frequency); (3) 'Have you thought seriously about killing yourself?' (seriousness); and (4) 'Have you thought about killing yourself for a long time?' (duration). Associations in responses to these four questions ranged from V = .40 to .63 in the present sample.

Computerized diagnostic interview schedule for children. At baseline, the C-DISC, version 2.3, was administered via computer by lay interviewers to establish psychiatric diagnoses consistent with DSM-III-R criteria (Shaffer, Fisher, et al., 1996). Diagnoses assessed are listed in Table 1.

Adolescent suicide interview for suicidal ideation. The ASI-SI is a semistructured interview to assess the characteristics of adolescents' SI. It was developed to complement the ASI for adolescent suicide attempters (Miranda et al., 2008; Shaffer, Gould, Fisher, & Trautman, 1990), which was also administered as part of the study and inquired about lifetime SA history. Questions are presented in a fixed order, with suggested probes, and fixed-interviewer-completed

Table 1 Baseline characteristics of adolescents who took part in the follow-up

	All (N = 506) M (SD)	No SA at follow-up (N = 464) M (SD)	SA at follow-up (N = 42) M (SD)	t	p
Age (Baseline)	15.6 (1.4)	15.6 (1.4)	15.6 (1.4)	0.15	.88
BDI Score (Baseline)	10.9 (8.9)	10.5 (8.7)	16.4 (9.9)	3.95	.00
	N (%)	N (%)	N (%)	χ^2	p
Sex					
Female	307 (61)	276 (59)	31 (74)	3.31	.07
Male	199 (39)	188 (41)	11 (26)		
Race/Ethnicity					
White	219 (44)	207 (46)	12 (29)	5.16	.27
Black	126 (25)	113 (25)	13 (31)		
Hispanic	88 (18)	77 (17)	11 (26)		
Asian	35 (7)	32 (7)	3 (7)		
Other	27 (5)	24 (5)	3 (7)		
C-DISC diagnosis at baseline					
Mood (past 6 months)	66 (13)	53 (11)	13 (31)	12.95	.00
Anxiety (past 6 months)	71 (14)	60 (13)	11 (26)	5.61	.02
Substance Use (past 6 months)	27 (5)	22 (5)	5 (12)	3.91	.05
Suicidal Ideation, past 3 months (CSS)					
Thought about killing yourself?	149 (29)	123 (27)	26 (62)	23.23	.00
Still thinking about killing yourself?	43 (8)	37 (8)	6 (14)	1.97	.16
Often thought about killing yourself	105 (21)	82 (18)	23 (55)	32.22	.00
Thought seriously about killing yourself?	76 (15)	57 (12)	19 (45)	32.77	.00
Thought about killing yourself for a long time?	65 (13)	50 (11)	15 (36)	21.39	.00
Suicide attempt history at baseline[a] (CSS, C-DISC, or ASI)	86 (17)	65 (14)	21 (50)	35.36	.00

Diagnoses assessed at baseline: Mood = major depressive disorder (MDD) or dysthymic disorder; Anxiety = Panic Disorder (PD), Agoraphobia, Social Phobia, Generalized Anxiety Disorder (GAD), or Overanxious Disorder; Substance use = Alcohol Abuse/Dependence, Marijuana Abuse/Dependence, or Other Substance Use/Dependence.
[a]Includes 11 adolescents who reported no suicide attempt history at baseline, but who reported, at follow-up, having made a lifetime attempt that occurred prior to the baseline assessment, and whose reported age of their most recent attempt fell before or at their age at baseline.

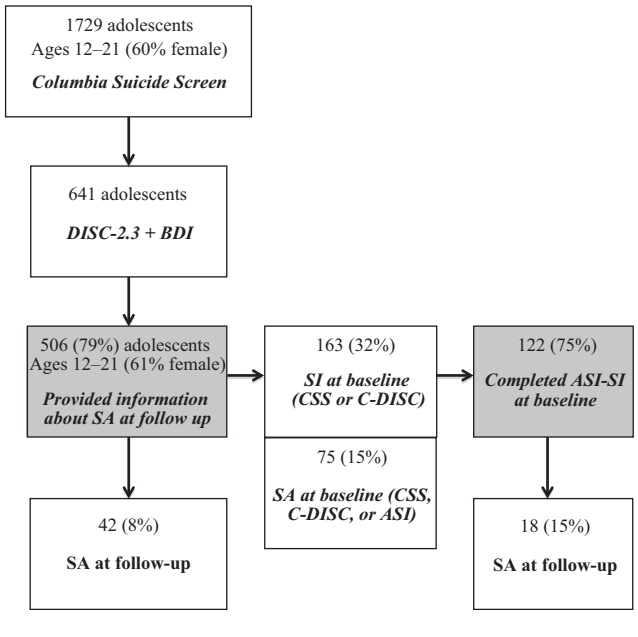

Figure 1 Sample selection. Shaded boxes indicate the final samples included in the analyses

rating scales that focus on the characteristics of the individual's most recent SI episode, including timing of his/her most recent ideation, frequency of SI, wish to die during his/her most recent SI, and length of a typical episode of ideation. Questions for which participants did not know an answer were counted as missing data. The ASI-SI was administered by Bachelor's level research assistants, supervised by a psychiatrist.

Beck depression inventory. The Beck depression inventory (BDI) (Beck & Steer, 1993) contains 21 items that assess cognitive, behavioral, affective, and somatic components of depression. It has demonstrated good reliability and validity for use with adolescents (Roberts, Lewinsohn, & Seeley, 1991; Strober, Green, & Carlson, 1981; Teri, 1982). The SI question was omitted from total-score calculations. Cronbach's alpha for the BDI was .88 in the present study.

Suicide attempt at follow-up. SAs during follow-up were determined via a modified version of the ASI, which asked participants the question, 'In your whole life, have you ever tried to kill yourself?', number of attempts, age at their last attempt, and whether their most recent attempt occurred after the baseline interview. Individuals who reported that any SA occurred after baseline were classified as having made a SA during the follow-up period (Miranda et al., 2014). Time between baseline and the SA was determined by subtracting participant age at baseline from age at their most recent follow-up attempt. Note that agreement between SA history, as reported on either the ASI or CSS at baseline, and SA history at follow-up was substantial, with κ = .69 and .70, respectively (excluding adolescents who reported a first-time SA at follow-up that occurred after the baseline interview).

Data analysis

To examine whether each of the baseline CSS ideation questions would predict a future SA (reported at follow-up) among the larger sample of 506 adolescents who provided this information at follow-up, separate logistic regression analyses were conducted in which currency, frequency, seriousness, and duration of SI on the CSS were entered as predictors of a future SA, adjusting for gender, presence of a C-DISC mood, anxiety, and substance use diagnosis, and SA history (as reported on the CSS, C-DISC, or ASI at baseline), with covariates included in the model if they differentiated between adolescents who did versus did not make a SA at follow-up at an alpha level of $p < .10$. In addition, all four CSS questions were entered simultaneously into one multivariate analysis to examine whether they predicted a future SA, adjusting for the other covariates.

Data from the 122 participants who completed the ASI-SI and the follow-up were also analyzed via logistic regression. SI characteristics examined as predictors of a future SA included timing of the most recent SI, frequency of SI, seriousness of the adolescent's wish to die, and length of the most recent SI episode, with variables dichotomized in a manner consistent with previous research (Miranda et al., 2014). Each characteristic was entered into its own logistic regression, adjusting for gender, depressive symptoms, and SA history, and also into a full model that included all characteristics. This model adjusted for depressive symptoms, rather than diagnosis, to reduce the number of variables in the model, given the smaller sample size.

Results

Baseline suicidal ideation and suicide attempt history

At baseline, 149 (29%) of 506 participants reported recent (previous 3 months) SI on the CSS, and 75 (15%) participants reported a lifetime SA history: 61 on the CSS, 65 on the C-DISC, and 63 on the ASI. There were 11 additional adolescents who did not report a SA at baseline, but who reported a SA at follow-up that they said occurred prior to baseline, and this information was verified by comparing their age at baseline with the age when they reported having made their most recent SA at follow-up. These adolescents were thus also classified as having a lifetime SA history at baseline, for a total of 86 (17%) adolescents with a lifetime SA history at baseline. Forty-three (8%) participants reported that they were still thinking about suicide (currency), 105 (21%) reported that they had often thought about killing themselves (frequency), 76 (15%) reported that they had thought seriously about killing themselves (seriousness), and 65 (13%) reported that they had thought about killing themselves for a long time (duration).

Forms of suicidal ideation at baseline that predicted a suicide attempt 4–6 years later

No suicide deaths occurred during the study period. Forty-two (8%) of 506 adolescents endorsed having made a SA during the follow-up period, either through ingestion ($N = 23$; 55%), use of a cutting instrument ($N = 7$; 17%), a gun ($N = 5$; 12%), or other methods ($N = 7$; 17%). Endorsement of recent SI (vs. not) in the previous 3 months at baseline was associated with 2.6 times higher odds of a future SA (95% CI = 1.3–5.5; $p < .01$), adjusting for sex, diagnosis, and previous SA history. Frequency and seriousness of ideation were associated with about three times higher odds of reporting a future SA ($p < .05$) in separate regression analyses that adjusted for sex, diagnosis, and SA history (see Table 2). In a multivariate model that included all forms of SI as predictors of a future SA, only frequency of SI was associated with increased risk of a future SA (OR = 3.6, 95% CI = 1.4–9.1; $p < .01$), while currency (OR = 0.2, 95% CI = 0.1–0.8; $p < .05$) was associated with decreased risk of a future SA.

Characteristics of suicidal ideation among adolescent ideators interviewed at baseline

Among the 122 participants who completed the ASI-SI at baseline and took part in the follow-up (see Table 3), 21% of adolescents ($N = 25$ of 119 who provided responses) reported that their most recent SI occurred within the previous 2 weeks, while the majority of adolescents (79%; $N = 94$) reported that their SI occurred more than 2 weeks before inquiry. Fifty-three percent ($N = 54$ of 101 who provided responses) of adolescents reported an ideation frequency of more than once per week. Most adolescents reported that they did not want to die or were uncertain about wanting to die during their most recent ideation episode ($N = 93$ of 121 who provided responses; 77%), with 23% ($N = 28$) reporting that they wanted to die. Seventy-two percent of adolescents reported that the typical length of their most recent SI was less than 1 hr ($N = 85$ of 118 who provided responses), while 28% ($N = 33$) reported SI that lasted an hour or longer.

Characteristics of suicidal ideation that predict a future suicide attempt among ideators with or without a lifetime suicide attempt history

Of the 122 suicide ideators who completed the follow-up assessment 4–6 years later, 15% ($N = 18$) of adolescents made a SA during the follow-up period (11 through ingestion, three with a gun, two through cutting, one through attempted hanging, and one through a combination of ingestion and cutting). There were no significant differences by age, gender, or race/ethnicity among individuals who did or did not endorse a SA at follow-up.

Of the four specific characteristics of SI examined as predictors of a future SA (see Table 4), SI length greater than 1 hr (vs. less than 1 hr; $OR = 3.6$, $p < .05$) was associated with a future SA. Frequency of SI, wish to die, and timing of SI were not significantly associated with a future SA.

Table 2 Responses to CSS suicidal ideation questions at baseline as predictors of a *Suicide Attempt at Follow-up (N = 506)*

Columbia suicide screen ideation questions	OR (95% CI), Separate regressions[a]	OR (95% CI), Full Model
Sex	...	1.3 (0.6–2.9)
Diagnosis		
Mood	...	1.6 (0.7–4.0)
Anxiety	...	1.2 (0.5–3.2)
Substance	...	1.2 (0.3–4.0)
Suicide Attempt History	...	3.8** (1.7–8.3)
Are you still thinking about killing yourself?	0.6 (0.2–1.9)	0.2* (0.1–0.8)
Have you often thought about killing yourself?	3.5** (1.7–7.2)	3.6** (1.4–9.1)
Have you thought seriously about killing yourself?	3.1** (1.4–6.7)	2.5^{+} (0.9–6.5)
Have you thought about killing yourself for a long time?	2.3* (1.1–5.2)	0.8 (0.3–2.2)

... Indicates different values for each regression.
[a]Each suicidal ideation characteristic entered into its own logistic regression, adjusting for sex, diagnosis, and suicide attempt history.
$+p < .10$; $*p < .05$; $**p < .01$

Of the 18 adolescents who made an attempt within the follow-up period, 11 made one SA – five within a year from baseline, three within 2 years of baseline, and two adolescents 3–4 years later (the interval for one participant was unknown). Seven adolescents made two or more SAs, with the most recent attempt occurring 1–5 years ($M = 2.4$, $SD = 1.4$) from baseline (information was not available about approximate timing of their first attempt). Among the adolescents who made one SA, those with a baseline SI length of 1 hr or more ($n = 5$) made a future SA, on average, within less than 1 year ($M = 0.6$, $SD = 0.9$), compared with individuals with typical SI of less than 1 hr ($n = 5$), whose future SA occurred within about 2 years of their baseline interview ($M = 2.4$, $SD = 1.1$), $t(8) = 2.78$, $p < .05$. This difference was even larger when examining adolescents ($N = 8$) who endorsed SI without a SA history at baseline. Among these adolescents, those whose baseline SI lasted 1 hr or more made the transition to a future SA, on average, within less than 1 year ($M = 0.5$, $SD = 1.0$), compared with individuals with typical SI of less than 1 hr, whose SA occurred within about 3 years ($M = 2.8$, $SD = 1.0$), $t(6) = 3.25$, $p < .05$.

Discussion

The present study is the first, of which we are aware, to prospectively identify specific characteristics of SI that predict a future SA among adolescents, independently of psychiatric diagnosis and previous SA history. Endorsement of recent SI (past 3 months) on a screening questionnaire at baseline, along with frequency ('Have you *often* thought...?'), seriousness ('Have you thought *seriously*...?'), and duration of ideation, was associated with increased risk of making a SA during a follow-up period. Among a subsample of adolescents who were interviewed about their SI, length of ideation (1 hr or more) significantly predicted a future attempt. Finally, preliminary evidence suggested that adolescents whose ideation lasted 1 hr or more made their attempt, on average, within 1 year of their baseline interview.

Our results support previous findings that endorsing recent SI at one time point is associated with future SAs (Lewinsohn et al., 1994; Reinherz et al., 2006; Thompson et al., 2009; Wichström, 2000). However, not all SI characteristics seem to predict a future SA equally. These data are also consistent with Negron et al.'s (1997) finding that adolescent attempters reported greater length of SI during their suicidal episode, compared with ideators, and also with Miranda et al.'s (2014) findings that adolescent attempters who reported longer suicide planning (1 hr or more) leading up to their most recent SA were at greater risk for a future attempt, compared with adolescents whose attempts were more impulsive. Interestingly, these findings are in contrast to a recent retrospective study with adults that found that among individuals whose first onset of SI was at about age 26, recurrence of SI was associated with lower odds of a SA (ten Have, van Dorsselaer, & de Graaf, 2013). However, this study did not measure length of SI. Perhaps among individuals who have not thought about suicide by adulthood, persistence of SI may be protective against SA. However, when SI occurs as early as adolescence, it enhances risk of a SA (Thompson, Dewa, & Phare, 2012). Alternatively, a 10-year follow-up study of a nationally representative sample of 15–54-year-olds found that a baseline history of SI without a plan was associated with decreased risk for a future suicidal plan, but having a history of making a previous suicide plan increased the odds of making future suicidal plans (Borges, Angst, Nock, Ruscio, & Kessler, 2008). Thus, it may not merely be the presence of SI, but the seriousness of SI that enhances risk for future suicidal behavior.

These findings might be understood in light of prevailing theories of suicide. Rudd's Fluid Vulnerability Theory suggests that individuals can establish a vulnerability to future SAs through experience (Rudd, 2006), as with having a history of previous SAs or SI. People who are more chronically vulnerable to suicidal behavior need fewer triggers to set off a suicidal episode (Rudd, 2006). Previous SAs may lower this threshold (Joiner & Rudd, 2000), as may length of suicide planning (Bagge, Glenn, & Lee, 2013). Our data support the possibility that longer duration of SI contributes to establishing vulnerability to SAs. The present findings might also be interpreted through Joiner's interpersonal-psychological theory of suicide, which suggests that suicide risk is a function of how much individuals have

Table 3 Baseline characteristics of ASI-SI completers who took part in the follow-up

	All	All			
	All (N = 122) M (SD)	No SA during follow-up (N = *104*) M (*SD*)	SA during follow-up (N = *18*) M (*SD*)	t	p
Age (Baseline)	15.5 (1.3)	15.5 (1.3)	15.4 (1.4)	0.06	.95
BDI Score (Baseline)	16.6 (9.8)	15.9 (9.8)	20.3 (9.0)	1.78	.08
	N (%)	N (%)	N (%)	χ^2	p
Sex					
Female	73 (60)	62 (60)	11 (61)	0.01	.90
Male	49 (40)	42 (40)	7 (39)		
Race/Ethnicity					
White	66 (54)	56 (54)	10 (56)	4.73	.32
Black	18 (15)	17 (16)	1 (6)		
Hispanic	18 (15)	16 (15)	2 (11)		
Asian	12 (10)	10 (10)	2 (11)		
Other	8 (7)	5 (5)	3 (17)		
DISC diagnosis at baseline					
Mood diagnosis	30 (25)	24 (24)	6 (33)	0.87	.35
Anxiety diagnosis	30 (25)	23 (22)	7 (39)	2.33	.13
Substance use diagnosis	16 (13)	11 (11)	5 (28)	3.99	.05
Suicide attempt history at baseline (CSS, C-DISC, or ASI)	25 (20)	19 (18)	6 (33)	2.14	.14
	N (%)	N (%)	N (%)	χ^2	p
Characteristics of Most Recent SI (ASI-SI)					
Timing (N = 119)					
>2 weeks ago	94 (79)	80 (79)	14 (78)	0.02	.89
Within past 2 weeks	25 (21)	21 (21)	4 (22)		
Frequency (N = 101)					
>1 every 2 weeks	47 (47)	42 (49)	5 (31)	1.79	.18
>1 per week	54 (53)	43 (51)	11 (69)		
Wish to die (N = 121)					
Did not want to die/uncertain	93 (77)	82 (80)	11 (61)	2.95	.09
Wanted to die	28 (23)	21 (20)	7 (39)		
Length of typical single ideation (N = 118)					
<1 hr	85 (72)	77 (76)	8 (47)	6.15	.01
1 hr or more	33 (28)	24 (24)	9 (53)		

acquired the capability to enact lethal self-injury, combined with how seriously they want to die (Joiner, 2005). Greater length of ideation may serve as a form of practice for future suicidal behavior, contributing to this acquired ability.

One unexpected finding was that currency of ideation (i.e., whether adolescents endorsed that they were *still* thinking about killing themselves) was associated with lower odds of a future SA in a full model that included all variables. This finding should be interpreted with caution, however, because endorsement of current SI was only associated with lower odds of a future SA after adjusting for the other ideation characteristics, suggesting that the findings may be due to the correlations among the questions (i.e., the correlations between currency of ideation and frequency, seriousness, and duration of SI were .47, .51, and .39, respectively).

Implications for assessment and treatment

This study suggests that screenings for adolescent suicide risk should not only inquire about SI but also about how seriously, how often, and for how long adolescents have thought about suicide. Furthermore, adolescents with recent SI may be at risk of transitioning to an attempt to the degree that they ideate for a long time (i.e., 1 hr or more). Assessments should thus inquire about these specific ideation characteristics. These characteristics may also serve as targets for intervention. For instance, treatment of adolescents who present with SI should focus on techniques that may decrease the length of their ideation (e.g., addressing distress tolerance, problem-solving, and mindfulness). Furthermore, interventions might also incorporate suicide safety plans (see Stanley & Brown, 2012) for adolescents who report greater frequency or length of their SI and even distress safety plans for undisclosed current suicide premeditation (Bagge, Littlefield, & Lee, 2013).

At the same time, the wording of the inquiry is important. Endorsement of a question about SI duration on the CSS (i.e., 'Have you thought about killing yourself for a long time?') was a less robust predictor of a future SA than was the actual length of

Table 4 Logistic regressions predicting suicide attempt (SA) at follow-up ($N = 122$)

	OR[a] (95% CI) separate regressions	p	OR (95% CI) Full Model	p
Sex	...		1.0 (0.4–3.7)	.98
BDI	...		1.0 (1.0–1.1)	.30
Suicide attempt history	...		1.4 (0.3–5.5)	.65
Timing of most recent SI ($N = 119$)				
>2 weeks ago[b]				
Within past 2 weeks	0.6 (0.2–2.5)	.53	0.7 (0.1–3.3)	.65
Frequency of ideation, most recent episode ($N = 101$)				
>1 every 2 weeks[b]				
>1 per week	1.8 (0.6–5.8)	.32	1.3 (0.4–4.7)	.67
Wish to die, most recent episode ($N = 121$)				
Did not want to die/uncertain[b]				
Wanted to die	2.2 (0.7–6.7)	.15	1.2 (0.3–4.8)	.82
Length of typical single ideation, last episode ($N = 118$)				
<1 hr[b]				
1 hr or more	3.1 (1.0–9.3)	.04	3.6 (1.0–12.7)	.04

... Indicates different values for each regression.
[a]Analyses adjust for sex, suicide attempt history, and BDI score at baseline.
[b]Reference category.

adolescents' most recent SI. Thus, inquiries about SI duration should be specific and focus on length.

Strengths and limitations

Strengths of this study include a racially and ethnically diverse community sample that was followed up over time, assessment of multiple characteristics of SI, adjustment for psychiatric diagnosis, and a high rate of follow-up (75–79%). However, there are a number of limitations. First, our assessment of SI characteristics was retrospective and thus subject to recall bias. Second, our assessment of a SA at follow-up was based on response to two questions on a telephone interview (i.e., whether participants had ever made a SA and whether it had been made since the baseline interview). Third, timing of the most recent attempt was determined by the difference between the participants' age at baseline and the age they reported being when they made their most recent attempt during the follow-up period. Thus, it was only precise down to years. Fourth, although the present study inquired about such characteristics as 'seriousness' and length of SI, it did not inquire about specific features of suicide planning, such as whether adolescents considered how, when, and where they would make an attempt. While it might be inferred that adolescents who reported a greater length of ideation were more likely to have a detailed plan, future research should specifically inquire about these characteristics. Finally, seven of the 18 adolescents who reported an attempt at follow-up made more than one attempt, and we thus did not have information on timing of their first attempt.

Concluding comments

This is the first study of which we are aware to examine whether the specific characteristics of SI assessed by questions used to screen for SI predict whether adolescents will make a future SA, beyond diagnosis and history of a previous SA. It is also the first study of which we are aware to examine specific SI characteristics associated with a future attempt among adolescents who were interviewed about their SI. In addition to making inquiries about whether a teenager has experienced recent SI, these data suggest that screening for SI should inquire about whether adolescents have *often* and *seriously* thought about killing themselves. Furthermore, length of a typical ideation episode is informative about their likelihood of transitioning to a future SA and also the timing of that transition. Thus, clinicians should also inquire about length of adolescents' recent SI, as an ideation episode lasting an hour or more may substantially increase their risk of making an attempt.

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Correspondence

Regina Miranda, Division of Child and Adolescent Psychiatry, New York State Psychiatric Institute, 1051 Riverside Drive, Unit 78, New York, NY 10065, USA; Email: MirandaR@nyspi.columbia.edu, regina.miranda@hunter.cuny.edu.

Key points

- Little research to date has addressed which characteristics of suicidal ideation contribute to the transition to future suicide attempts among adolescents.
- We found that among adolescents screened for suicidal ideation, thinking about suicide *often* was associated with over three times higher odds of making a future suicide attempt, adjusting for diagnosis, previous attempt history, and responses to other suicidal ideation questions.
- Adolescents whose baseline suicidal ideation lasted 1 hr or longer had 3.6 times higher odds of making a future suicide attempt and made the transition to a future attempt earlier than did adolescents whose baseline ideation lasted less than 1 hr.
- Assessments of suicidal ideation should inquire about the form that suicidal ideation takes, including its frequency and duration.

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Universitat Autònoma de Barcelona
Columbia University Medical Center
New York State Psychiatric Institute