1 The Rising Prominence of College and University Mental Health Issues

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1.1 Introduction
Throughout parts of the Western World, the increasing visibility of college and university mental health issues has been the result of both unfortunate and fortunate circumstances. In the former category, belong the tragedies of isolated students and the murder-suicides on two particular American campuses. Both of these are rare occurrences within the general population and equally so on the campuses of higher learning. However, within the recent past, a number of student suicides have received broad exposure in the media within the United States. Suicides at prominent universities [1,2] have highlighted the inadequacies of mental health services [3], institutional policies [4], and important ethical and legal concerns [5]. The mass shootings at Virginia Tech on April 16, 2007 [6] followed by the February 14, 2008 incident at Northern Illinois University [7] gripped the attention of the public. Fortunately, clinical and epidemiological research, accompanied by innovative programmatic development, has provided a more comprehensive appreciation of the scope of the issues. Scientific advances in the diagnosis and treatment of mental disorders have undoubtedly permitted some students, who heretofore would not have attended college, to do so. The development of more effective mental health care through advances in psychotherapy and psychopharmacology enables many teenagers to achieve a degree of emotional stability necessary for college and success in their studies and social–emotional development. Increasingly sophisticated college mental health services have ensured continuity of care for these students as well as providing assistance to a growing population of students presenting with new problems after matriculation.

1.2 How Prevalent are Emotional Disturbances and Mental Disorders?
Mental disorders, for the most part, are disorders of young people and many tend to be lifelong. (Figure 1.1 illustrates high-risk periods for psychopathology). More is now known
about the vulnerability to and the onset of mood and anxiety disorders, for example, even within grade school children. College mental health clinicians know that the number of matriculating students with a history of mental health treatment and those who enter college on psychotropic medication and/or require ongoing psychotherapy has increased dramatically. One significant pressure on college mental health services therefore, can be attributed to this student population. However, the increased need for mental health services is much broader [8].

### 1.2.1 Student Surveys

Epidemiological studies of the prevalence of mental health issues among college students are becoming more scientifically rigorous. Some of these will be briefly described shortly. (For an in depth discussion of surveys and research initiatives see Chapter 16.) However, much of the early and continuing indications of increasing college mental health problems have been elucidated by two significant survey mechanisms. The first survey is one conducted annually since 2000 by the American College Health Association (ACHA). Of the approximately 18 million students enrolled in the US, the ACHA National College Health Assessment reported on nearly 95,000 student responses during the year 2006 [10]. This survey indicated the percentage of students reporting the following conditions/disorders:

- **Anorexia** 1.8%
- **Anxiety** 13.4%
- **Bulimia** 2.2%
- **Depression** 18.4%
  - 14.8% of students said they had been diagnosed with depression sometime in their lives
  - 26% of those diagnosed with depression were receiving psychotherapy
  - 36.6% of those diagnosed with depression were taking medication
  - 1.3% made at least one suicide attempt
  - 9.3% considered suicide within the last school year
  - 17.8% experienced depression within the last school year
- **Seasonal affective disorder** 7.7%
- **Substance abuse problems** 4.0%

To place these findings in perspective, only back pain, allergy problems, and sinus infection were reported more frequently than depression. These findings did not change substantially in the spring of 2008 report surveying 80,121 students [11]. This most recent report found that at least once in the past year, 63% of students felt hopeless, 93% felt overwhelmed, 91% felt exhausted (not from physical activity), 79% felt sad, and 45% felt so depressed it was difficult to function.

Figures 1.2–1.5 provide a graphic view of the changes in the numbers of students responding to questions about depression and treatment from 2000 to 2007.
The Healthy Minds Study group at the University of Michigan published a number of recent reports utilizing self-report measures such as the Patient Health Questionnaire (PHQ-9), a widely adopted depression screening tool in primary care medicine ([12] illustrated in Figure 1.6). A random sample of approximately 2800 students at a large state university, with demographic characteristics similar to the national student population, completed a web-based survey that found a prevalence of any depressive (major depression/dysthymia) or anxiety disorder (panic/generalized anxiety disorders) of 15.6% for undergraduates and 13% for graduate students [13]. Students were also queried about mental

![Figure 1.2](image1.png)

**Figure 1.2** American College Health Association/National Health Assessment, Summarized Mental Health Data and Trends, Spring 2000–Spring 2007.

![Figure 1.3](image2.png)

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health service utilization within the previous year. Fifteen percent of respondents received psychotropic medication or psychotherapy (9% were prescribed medication). However, only 36% of those students with positive screens for major depression sought help. A second report [14] found that over 50% of students suffered from at least one mental health problem at baseline and that this persisted in 60% of this group 2 years later, yet only one half of this second group received mental health services during the 2-year period. Self-injurious

Figure 1.4 American College Health Association/National Health Assessment, Summarized Mental Health Data and Trends, Spring 2000–Spring 2007.

health service utilization within the previous year. Fifteen percent of respondents received psychotropic medication or psychotherapy (9% were prescribed medication). However, only 36% of those students with positive screens for major depression sought help. A second report [14] found that over 50% of students suffered from at least one mental health problem at baseline and that this persisted in 60% of this group 2 years later, yet only one half of this second group received mental health services during the 2-year period. Self-injurious

Figure 1.5 American College Health Association/National Health Assessment, Summarized Mental Health Data and Trends, Spring 2000–Spring 2007.
behavior was reported by 7% of students over a previous 4-week period [15]; but, only one quarter received either psychotherapy or medication within the previous 12 months. Finally, the most recent report from this group [16] found that students with depression characterized by loss of interest and pleasure in activities were twice as likely to drop out of college. Those students with both depression and anxiety were noted as well to have significantly lower grade point average (GPA).

### Patient Health Questionnaire (PHQ-9)

| 1. Little interest or pleasure in doing things | 0 | 1 | 2 | 3 |
| 2. Feeling down, depressed, or hopeless | 0 | 1 | 2 | 3 |
| 3. Trouble falling or staying asleep, or sleeping too much | 0 | 1 | 2 | 3 |
| 4. Feeling tired or having little energy | 0 | 1 | 2 | 3 |
| 5. Poor appetite or overeating | 0 | 1 | 2 | 3 |
| 6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down | 0 | 1 | 2 | 3 |
| 7. Trouble concentrating on things, such as reading the newspaper or watching television | 0 | 1 | 2 | 3 |
| 8. Moving or speaking so slowly that other people could have noticed, or the opposite — being so fidgety or restless that you have been moving around a lot more than usual | 0 | 1 | 2 | 3 |
| 9. Thoughts that you would be better off dead, or of hurting yourself in some way | 0 | 1 | 2 | 3 |

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10. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

<table>
<thead>
<tr>
<th>Not difficult at all</th>
<th>Somewhat difficult</th>
<th>Very difficult</th>
<th>Extremely difficult</th>
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**Figure 1.6** Patient Health Questionnaire (PHQ-9). Spitzer RL, Williams JB, Kroenke K et al. Copyright © 1999 Pfizer Inc.
The College Screening Project at Emory University also utilized the PHQ-9 module for depression, accompanied by additional questions on anxiety, suicidal ideation, self-harm behavior, and past suicide attempts [17]. Of 729 respondents, 16.5% acknowledged a previous suicide attempt or self-injurious episode, with 11.1% admitting suicidal ideation within the previous 4 weeks. Not surprisingly, those students with higher depression scores on the PHQ-9 reported more suicidal ideation. Of those with moderately severe to severe depression and those experiencing suicidal thoughts, more than 80% were receiving no treatment.

Lastly, 26,000 undergraduate and graduate students from 70 institutions, each with an average enrollment of nearly 18,000, responded to a web-based questionnaire from the National Research Consortium of Counseling Centers in Higher Education. The Survey of College Student Suicidality found 6% percent of undergraduates and 4% of graduate students seriously considered suicide in the previous 12 months [18]. For the majority of these students, suicidal thoughts were fleeting and lasted no longer than one day. However, of those who experienced a recent suicidal crisis, more than 50% sought no help. This study again supports the finding of low mental health utilization by struggling students.

### 1.2.2 Counseling Director Surveys

The second long-standing survey, The National Survey of Directors, has been conducted annually since 1981 by Dr Robert Gallagher. A limited number of Canadian and American administrative heads of colleges and universities participate in this survey. Some of the relevant findings [19] from the most recent report of 284 participants, representing 3,441,000 students, include:

- 9% of students (310,000) sought counseling in the past year
- 29.6% of students (about 1 million) were seen in other contexts such as workshops, orientations, class presentations
- 60% of campuses have psychiatric services but often with insufficient psychiatric consultation hours
- 16% of center patients are referred for psychiatric evaluation
- 26% of center patients are on psychotropic medication, an increase from 9% in 1994 and 20% in 2003
- 93% of directors reported an increased number of matriculants on medications
- 95% of directors acknowledge greater patient acuity leading to
  - 64% reporting staff burnout
  - 64% reporting shortages during peak times
  - 62% reporting decreased focus on students with normal developmental concerns
  - 33.5% reporting premature termination of treatment
- Directors report nearly 50% of patients have severe psychological problems
  - 7.5% of students have serious impairment that requires leave or continuation only with extensive psychological/psychiatric treatment
- 53% of directors report an increase from the previous year in self injury
- 35.6% of directors noted an increase in students with eating disorders from the previous year
- 25.4% reported an increase in sexual assault cases compared to previous year
- 2075 students hospitalized (average of 8.2 students per school)
- 118 student suicides
- Other stresses reported by directors include
- 67% report increase in crisis counseling
- 66.5% report challenges in finding long-term treatment resources
- 59.5% report growing service demand without increase in resources
- 81% report significant increase of consultation requests from concerned faculty about troubled students.

1.2.3 Toward a More Rigorous Assessment of the Mental Health of College Students

Surveys have played an important role in identifying concerns about the mental health of college students. However, surveys have inherent limitations. In those recent studies relying on screening instruments such as the PHQ-9, symptoms, even when measured with validated instruments, are not equivalent to establishing clinical diagnoses and may not consider contextual issues in the college and university settings [20]. For example, many students become symptomatic secondary to short-lived situational and developmental crises. As well, nearly all of the surveys ascertained only the presence of a limited number of disorders. Cross-sectional studies can provide only associational patterns and not causality. Some surveys may not be representative of the national college mental health picture since study participation by institutions was not random. Moreover, some colleges may join studies because of problems unique to their campuses. Lastly, no studies have included community samples or non-college attending comparison groups. Nevertheless, in reviewing numerous investigations, between 12% and 18% of college students appear to meet diagnostic criteria for mental disorders [21]. How accurate is this finding?

Some findings from a very recent report from the Center for the Study of Collegiate Mental Health [22] are summarized in Table 1.1. The report is a significant contribution since student patients, not the entire student population, provided responses.

<table>
<thead>
<tr>
<th>Table 1.1</th>
<th>Selected data from the CSCMH Pilot Study</th>
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<tbody>
<tr>
<td>90% of patients had counseling before college, 18% during college and 15% both</td>
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<tr>
<td>10% of patients prescribed medication before college, 14% during and 11% both</td>
<td></td>
</tr>
<tr>
<td>5% of patient experienced psychiatric hospitalization before college, 14% during and 1% both</td>
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<tr>
<td>7% of patients admitted to strong fears of losing control acting violently</td>
<td></td>
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<tr>
<td>1% of patients acknowledging binge drinking did so 10 or more times in preceding 2 weeks</td>
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Center for the Study of Collegiate Mental Health 2009.
At the end of 2008, an article appeared in the *Archives of General Psychiatry*, which reported on 12-month prevalence rates of psychiatric disorders and mental health utilization rates in college-aged individuals [23]. From the 43,000 participants in the 2001–2002 National Epidemiological Survey on Alcohol and Related Conditions (NESARC), data was abstracted for a subsample of 5092 young adults between the ages of 19 and 25. A group of nearly 2200 college students (studying full-time or part-time within the previous year) was compared to a peer group of approximately 2900 not attending college [24]. What distinguishes this study from previously described ones is:

- Face-to-face interviews administered by trained non-clinicians
- Use of a reliable and valid structured clinical interview based on Diagnostic and Statistical Manual-IV (DSM-IV) criteria
- Assessment for a broad range of psychopathology including:
  - Substance abuse disorders (alcohol and drug abuse or dependence and nicotine dependence)
  - Mood disorders (major depression, dysthymia, and bipolar disorder)
  - Anxiety disorders (panic, social anxiety, generalized anxiety disorders and specific phobia)
  - Lifetime history of conduct and selected personality disorders (paranoid, schizoid, antisocial, histrionic, obsessive-compulsive, dependent, and avoidant disorders)
  - Assessments of stressful life events
  - Specification of sociodemographic characteristics.

Stressful life events were assessed through the 12-item Social Readjustment Rating Scale that examined boyfriend or girlfriend relationship breakup, separation, divorce, and death of a spouse. Mental health service utilization was defined as receiving treatment within the past 12 months for a mood and or anxiety disorder either through hospitalization, emergency department visit, or medication. Substance abuse treatment included being seen by a professional or paraprofessional, inpatient or outpatient treatment (including detoxification, rehabilitation, methadone maintenance, emergency department/crisis center visit, or self-help group). Table 1.2 summarizes some of the psychopathology and treatment findings.

<table>
<thead>
<tr>
<th>Disorder</th>
<th>College</th>
<th>Non-college</th>
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<tbody>
<tr>
<td>Any psychiatric diagnosis</td>
<td>45.79%</td>
<td>47.74%</td>
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<tr>
<td>Any Axis I disorder</td>
<td>39.84%</td>
<td>41.98%</td>
</tr>
<tr>
<td>Any mood disorder</td>
<td>10.62%</td>
<td>11.86%</td>
</tr>
<tr>
<td>Alcohol use disorder</td>
<td>20.37%</td>
<td>16.98%</td>
</tr>
<tr>
<td>Personality disorder</td>
<td>17.68%</td>
<td>21.55%</td>
</tr>
<tr>
<td>Avoidant:</td>
<td>2.31%</td>
<td>4.61%</td>
</tr>
<tr>
<td>Dependent</td>
<td>0.51%</td>
<td>1.29%</td>
</tr>
<tr>
<td>Obsessive Compulsive</td>
<td>8.24%</td>
<td>8.0%</td>
</tr>
<tr>
<td>Paranoid</td>
<td>4.86%</td>
<td>8.74%</td>
</tr>
<tr>
<td>Schizoid, histrionic, and antisocial</td>
<td>4.7%</td>
<td>8.51%</td>
</tr>
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</table>

Modified from Blanco et al. *Archives of General Psychiatry* 65:1429–1437.
from this study employing the National Institute on Alcohol Abuse and Alcoholism Alcohol Use Disorder and Associated Disabilities Interview Schedule [25]. It is important to note that this report did not provide prevalence rates for borderline and narcissistic personality disorders, both of which are challenging treatment conditions in college mental health. However, two recent reports on the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions, which included 34,653 face-to-face structured interviews of adults using DSM criteria found a 6% lifetime prevalence rate (7.7% men versus 4.8% women) for narcissistic personality disorder with considerable psychosocial disability among men [26]. In addition, there was significant comorbidity in terms of past-year, co-occurrence of substance abuse, major depressive, borderline personality, anxiety, and other personality disorders. The same authors also noted 5.9% prevalence of borderline personality disorder with no gender difference but considerable psychosocial disability among women (Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions) [27].

1.2.4 Alcohol and Substance Use

From a developmental point of view, it is not surprising that alcohol and substance use are so common among college and university students. Late adolescence and early adulthood for many, although not all, is a time for experimentation in this area. However, for some students this evolves into alcohol and substance abuse and dependence. One of the more striking findings in the study by Blanco et al. [23] was the higher number of college students, compared to their non-college attending peers, who met criteria for alcohol use disorder. Moreover, college students with drug and alcohol abuse are less likely to receive treatment. One likely reason for this latter finding may be the social acceptance of alcohol and drug use within the campus culture. It is possible students with significant problems are more reluctant to seek treatment for fear of being stigmatized. The National Center on Addiction and Substance Abuse Study (CASA) [28] supported other reports in finding that college students have higher rates of alcohol or drug addiction than the general public: 22.9% of students met the medical definition for alcohol or drug abuse or dependence compared with 8.5% of the general population 12 and older. Despite educational and outreach programs, the percentage of students who reported binge drinking (defined as having five drinks for male students and four drinks for female students during one “drinking occasion” during the previous two weeks) held steady at approximately 40%. The CASA study noted also that in 2003, 83% of all campus arrests involved alcohol. Other findings from this study period of 1993–2005 included:

- Students who abused painkillers (Percocet, Vicodin, OxyContin) during the past month rose from fewer than 1% in 1993 to 3.1% in 2005
- Students reporting smoking marijuana heavily – at least 20 days during the preceding month – more than doubled from 1.9% to 4%
- Students reporting illegal drug use other than marijuana, such as cocaine or heroin, increased from 5.4% to 8.2%.

There is some indication that binge drinking may occur in the context of drinking games and that women appear to have higher blood alcohol levels than their male peers when they
attended theme parties [29]. Similarly, it may be that students celebrating their 21st birthday are incorporating more severe alcohol use, as reported at one large southeastern university. Table 1.3 illustrates a recent study [30] that examined binge drinking as detailed in numerous surveys from 120 to 140 representative 4-year campuses utilizing the same criteria as that used in the CASA study.

In short, it is fair to say that, despite significant programmatic efforts, there appear to be few gains in this arena. The Amethyst Initiative, supported initially by approximately 100 college presidents, is an attempt to bring attention to the problem of alcohol on campus through proposing a drop in drinking age from 21 to 18. This group advocates that binge drinking would be decreased with a change in drinking age laws [31].

Increasing stimulant abuse among college students has been the subject of considerable discussion. DeSantis et al. [32] reported, that among 1800 students at a large public institution, 34% acknowledged illegal use of stimulants prescribed for the treatment of attention deficit–hyperactivity disorder (ADHD). Many students use these medications to combat fatigue and to study more effectively. Stimulants are readily available on most campuses. Often they are procured from peers with prescriptions for bona fide diagnoses of ADHD. The use of cognitive enhancers is gaining rapid acceptance among students as well as scientists and this practice is the subject of debate by neuroethicists [33].

### 1.3 Study Limitations

The data from the reviewed studies can, for the most part, present a cross-sectional approach to college student stresses and psychopathology. Nothing can be said of the fate of either after graduation. There are few rigorous, long-term prospective studies, such as that by Vaillant [34], that follow graduates through succeeding phases of life. Indeed, much of what occurs in undergraduate and graduate students must be understood within the context and ethos of the educational experience. This includes issues of alcohol abuse, traumatic

<table>
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<tr>
<th>Table 1.3</th>
<th>College alcohol study</th>
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<tr>
<td>Consolization of 14-year surveys of 120–140 representative 4-year campuses</td>
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<tr>
<td>Binge drinking defined as ≥5 drinks for men and ≥4 for women on a single occasion in a 2-week period</td>
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<tr>
<td>44% of students reported binge drinking and this was associated with</td>
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<tr>
<td>Missing class</td>
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<tr>
<td>Falling behind in school work</td>
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<tr>
<td>Less studying and lower grades</td>
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<tr>
<td>More likely when drinking to get in trouble with police</td>
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<tr>
<td>Engage in unprotected and impulsive sexual activity</td>
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<tr>
<td>Colleges with high levels of binge drinking associated with greater levels of sexual assault</td>
<td></td>
</tr>
<tr>
<td>Among students who drive</td>
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</tr>
<tr>
<td>13% (2 million students) drove after binge drinking</td>
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</tr>
<tr>
<td>23% (3 million students) rode with intoxicated or high driver</td>
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</tr>
<tr>
<td>60% of binge drinkers met alcohol abuse criteria</td>
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<tr>
<td>20% met criteria for alcohol dependence criteria</td>
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<tr>
<td>Fewer than 25% acknowledged having an alcohol problem</td>
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<tr>
<td>Banning alcohol on campus/dormitories reduced binge drinking risk</td>
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<tr>
<td>Fraternity and sorority membership in freshman increased risk</td>
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experiences, depression and suicidality, to name but a few. (Chapter 5 addresses limitations of self-report measures in greater detail.)

The NESARC study delineates precipitants of emotional difficulties such as a breakup in a dating relationship, marital separation, divorce, or the death of a spouse consistent with significant findings from psychiatric research. Kendler’s work in 1995 [35], for example, has demonstrated similar results in adults regarding when individuals are likely to have a major depression as well as what individual genetic characteristics confer greater vulnerability. Individuals with a particular configuration of serotonin genetics require fewer life stresses before developing depression [36]. The NESARC study cannot elucidate the duration of personality disorders diagnosed in surprisingly high numbers of college students. Anecdotally, a number of college mental health clinicians have raised question about the prevalence of obsessive compulsive personality disorder found in this study since most studies support borderline, narcissistic, and antisocial personality disorders as being more prevalent. Could this be a reflection of the academic challenge faced by some students in particularly competitive disciplines? It is clear now, that some personality disorders are not as enduring as once believed [37,38], which invites the question about the time limited contribution of central developmental challenges faced by many college students.

1.4 A Developmental Approach to College Mental Health

1.4.1 Psychosocial Developmental Considerations

Eichler [39] has written about the helpfulness of a developmental approach to college counseling from a psychodynamic perspective. Adolescence is often characterized as the second separation-individuation phase referring to the heightened quest for independence from parents and the establishment of a career trajectory. Although a life-long process, the consolidation of one’s self perception is an important developmental task at this age. The ability to initiate and sustain mature, sexual, and loving relationships is yet another aspect of this phase influenced dramatically by earlier interpersonal relationships or the lack of them. Students entering college with few successful relationships are expectedly vulnerable to the challenges of the college years. Such students tend not to be open to new social opportunities, for they are experienced as threatening, which in turn limits social and emotional growth during the years of higher education. Not only may such students be unsuccessful in new relationships; they may not be open to new ideas. Both can limit the college experience significantly.

However, it must be remembered that despite movement away from the nuclear family in one sense, connectedness to one’s family must also be maintained. Indeed, most late adolescents enjoy a satisfying relationship with their parents and end up adopting values similar to those held by their parents. This is not to say that some students continue to master these issues in college through inconsistent or charged relationships with professors, administrators, and of course, therapists.

Eichler correctly notes that this ongoing challenge can be seen in the ambivalence which characterizes some therapist-patient relationships. Nearly one fifth of students fail to keep a second appointment at the college mental health service and more than 40% of student treatments were characterized by therapists as having prematurely terminated [40]. Parenthetically, this phenomenon can be especially challenging to student or resident therapists who do not adopt a developmental orientation and who invariably anticipate all college students will be highly intelligent and motivated for treatment.
Indeed, it is often helpful to view therapy for some students as episodic in nature with return to treatment as determined by the student. This is not a novel idea. Many clinicians from differing perspectives emphasize that psychotherapeutic work proceeds during times of hiatus from treatment, often leading to periods of consolidation and integration of gains. Eichler advocates that the central task of therapists is to adopt a developmental view such that interventions, be they brief by default or time limited through planning, promote developmental plasticity at times when students face challenges and stresses. In other words, what can often be most helpful is supporting student strengths during stressful times to promote their mastery of conflict, thereby permitting continued psychological development. Eichler reminds that many students experiencing immobilization from a problem rely on turning the passive into the active. That is, for many students mastery is acquired through action-oriented new initiatives. Some of these may be unhelpful but they can nevertheless be learning experiences if understood within the context of a treatment experience.

This is not to say that interpretive work should not be conducted as appropriate. All therapies reside on a continuum between expressive and supportive orientations depending on the needs of the patient. The college mental health service is a rewarding experience for many therapists who provide, for example, brief dynamic psychotherapies based on a central issue [41], core conflictual relationship theme [42] or cynical maladaptive behaviour [43].

Last, since it has been emphasized that a growing number of students are matriculating with previous psychiatric disorders and treatment experiences, the Jed Foundation and the American Psychiatric Foundation are now addressing the developmental task of transition from high school to college [44]. In addition to the many opportunities for psychosocial and intellectual growth in the college experience, the project reminds that for the vulnerable entering student, the challenges can be overwhelming. However, among students without a previous mental health history, these challenges can precipitate the onset of new disorders. The two organizations are assembling free guides for students and parents to raise awareness around the potential stresses in adapting to college that will encourage the utilization of mental health resources. Concerns about this period in life are also supported, for example, by The High School Youth Risk Survey [45] which has demonstrated the following:

- more than 28% of 13,600 students reported sadness and hopelessness every day for more than 2 weeks
- suicidal ideation is experienced by nearly 20%
- specific suicide plans had been made by approximately 15%.
- suicide attempts had been acknowledged by almost 9% of the respondents.

### 1.4.2 Biological Developmental Considerations

That brain development continues into the third decade of life was unappreciated until recently. Brain structure, it was argued previously, was essentially determined by age three with maturational consolidation completed prior to adolescence. Moreover, 95% of brain cells were considered formed by age 6. It is clear now that the adolescent brain is more precisely a brain in transition and that there are ongoing changes in neuronal circuitry postpubertally. The most significant of these changes are central to the development of
higher-order cognition and emotionality and therefore are found in the prefrontal and temporal cortices, the hippocampus and the amygdala. The last structure is considered to be the gateway for emotion, providing affective valence to events that are remembered either within or outside of awareness. It also modulates the storage and strength of memories. The hippocampus is the most central learning and memory structure. Neuronal plasticity is best exemplified in the processes of learning and memory which involve the creation of new genetic material and enhancement of neuronal connectivity. Hippocampal activity changes both brain structure and function through the creation of neurons. In addition, each day approximately 1000 new neurons are created chiefly in the hippocampus and, although their function is not totally clear, it may be that these neurons play an important role in learning through providing temporality to memories. The maturation of the prefrontal cortex is essential in cognitive processing and executive functioning (e.g. abstract reasoning, self awareness, attention). It is clear that maturation, as exemplified by neuronal pruning and growth in myelinization, occurs last in the prefrontal cortex, implying earlier less effective executive functioning. Figure 1.7 illustrates this process.

Figure 1.7  Brain mapping. This is a study of cortical gray matter (GM) development in children and adolescents by using a brain-mapping technique and a prospectively studied sample of 13 healthy children (4–21 years old), who were scanned with magnetic resonance imaging every 2 years for 8–10 years. Because the scans were obtained repeatedly on the same subjects over time, statistical extrapolation of points in between scans enabled construction of an animated time-lapse sequence (“movie”) of pediatric brain development. GM development in childhood through early adulthood is non-linear and progresses in a localized, region-specific manner coinciding with the functional maturation. Regions associated with more primary functions (e.g. primary motor cortex) develop earlier compared with the regions that are involved with more complex and integrative tasks (e.g. temporal lobe and prefrontal cortex). Gogtay, N., Giedd, J.N. (2004) Structural magnetic resonance imaging of the adolescent brain. Annals of the New York Academy of Sciences, 1021, 77–85.
Last, ADHD, an exceptionally common clinical diagnosis among college students, is characterized by a delay of approximately 3 years in cortical maturation during childhood and adolescence [46]. Even by the ages of 18–20, the thickness of the cortices in those with ADHD is demonstrably less than those without this diagnosis.

There are additional changes to the brain that are worth noting. First, neurotransmitter alterations in dopamine in certain areas are inextricably linked to the modulation of rewarding stimuli. Fluctuations in dopamine, therefore, may be relevant in understanding the frequency of novelty seeking, alcohol and substance abuse, and other high-risk behavior among college students [47]. Greater appreciation of the neurobiology of risk taking has highlighted the health paradox of adolescence. Simply stated, adolescence is the physically healthiest time in the life span, characterized, for example, by increased strength, reasoning capacity, and immune function; yet the overall morbidity and mortality rates increase 200% from childhood to late adolescence [48]. Moreover, the most important contributors to this increase are those related to problems with control of behavior and emotion as manifested in accidents, suicide, violence, mental illness, and risky behavior. Future research must explore the contribution of the immaturity of frontal and temporal lobes to this paradox. Second, it may be that the gradual increase in adolescence of the stress hormone cortisol might explain why some vulnerable students develop emotional or psychiatric difficulties in college [49]. In summary, the relationship between brain development, as observed in structural and functional changes related to learning, and social and emotional development is intriguing.

1.4.3 Toward an Integrative Approach

What is the impact of binge drinking, estimated to be beyond 40% of students in some surveys, on the development of alcohol dependence or personality and brain development? A small study has found white matter abnormalities as demonstrated through functional magnetic resonance imaging and diffusion tensor imaging in teens who binge drink [50]. These findings complement previous work demonstrating teens who binge have less ability to retrieve information (Figure 1.8) [51,52]. In short, although it is true that the human brain

![Figure 1.8](https://example.com/brain-diagram)

1. Inhibition: restricting impulsivity/inappropriate behavior
2. Planning and foresight: capacity to formulate future actions, correcting errors in judgment.
3. Decision Making: capacity to make choices; reward appraisal; social appraisal utilizing social norms/surveillance; abstract reasoning
4. Attentional flexibility: capacity to shift focus away from a stimulus/input and re-focus in an efficient manner

*Figure 1.8 The role of the prefrontal cortex in executive functions. Based on data from Brown, S., McGue, M., Maggs, J., et al. (2008). Components of executive and sample behaviors. A developmental perspective on alcohol and youths 16 to 20 years of age. Pediatrics, Suppl 4, S290–S230.*
is characterized by its neuroplasticity, it is also true that advances have explicated the sensitivity of the brain to cumulative insults from use of hallucinogens, marijuana, cocaine, and other substances [53–55]. Imaging studies have demonstrated both structural and functional changes in the brain that have significant and enduring effects [56]. It appears, as well, that teens are particularly susceptible to sleep deprivation and that this condition influences not only learning but has significant impact on resiliency. It is likely that insufficient sleep in adolescence may play an important role in aggression, impulsivity, and affect regulation [48].

It is clear that the most accurate model for appreciating human development is based on gene–environment interaction. For example, it is widely accepted that an increasing number of matriculating students enter college with previous treatment experiences. This includes psychotherapy and or psychotropic medications. Yet other students who have suffered childhood maltreatment, but have never received help, bring with them a vulnerability to a number of disorders and often problem situations. The enduring effect of attachment disorders secondary to loss and trauma in their parents’ earlier lives is substantial and colors the manner in which such students experience themselves and the world around them. These include the ability to establish intimate and trusting relationships and the constant re-enactment of earlier disappointing relationships. This re-enactment is most frequently characterized by repeated self-defeating behaviors, which may take the form of conflicts about achievement and success in college. In addition, these students are more at risk for mood, anxiety, and eating disorders. Certain ubiquitous behaviors addressed in many of the reviewed surveys will have very different meaning to the student with previous experience of childhood maltreatment and other psychological trauma [57]. In a very different way, the developmental issues facing young adult combat veterans returning to college in increasing numbers will be similar to their non-veteran peers but may also include challenges of integrating previous unfortunate experiences, which may affect learning and socialization.

The same may be said of graduate students, and some professional students, who often experience different stresses by virtue of their age, marital status, family burden, indebtedness, and chosen area of study [58]. The success of those graduate students pursuing science degrees, and indeed their careers, is inextricably tied to establishing a productive advising and mentoring relationship. This often challenging process is generally not one faced by undergraduate students. The persistent pressure of developing successful scientific studies that result in publication as well as teaching responsibilities are other situations often not experienced by undergraduate or medical students unless the latter are enrolled in combined MD–PhD programs. Finally, many medical specialties have noted the unusual developmental challenges faced in 6 year medical schools where students are accepted to medical school directly from high school. Because of curricular time constraints these students take fewer liberal arts courses in the first two years of their equivalent undergraduate phase and have less time for certain social experiences taken for granted by other college students.

In short, neither genetics nor environmental experiences are sufficient in themselves to explain emotional and behavioral disorders among college students. The forces impacting on a student’s well being and adjustment to higher education are complex and, therefore, must be appreciated from an overarching developmental approach that addresses both the brain and the mind.
1.5 Ethical and Legal Issues

This chapter began by noting the rising prominence of college mental health issues particularly in the US. Most of this can be attributed to rare, but rather dramatic, large-scale tragedies eventuating in the deaths of many. However, a small number of high profile student suicides also alerted college and university administrators of the need for more clearly articulated policies that respected student needs. As an example, given the frequency of depression on campuses, the practice of suspending all suicidal students has been criticized widely. Because of liability concerns, many institutions insisted on this practice that, in many situations, is short sighted regarding the impact on the student. Chapter 7 will address these issues in detail. In short, accessibility, adequacy and fiduciary responsibility of and for mental health services, health insurance, and confidentiality have been under review.

1.6 Conclusion

This chapter has summarized some of the key issues facing college students and college mental health service providers as indicated in national surveys and epidemiological studies. Only recently has the developmental, clinical, and administrative complexity of these issues been explicated. Higher education is now aware of the need to establish student access to a broad range of services both on campus and off campus, create sophisticated educational programs that address the ubiquity and destigmatization of mental illness and provide accurate and responsible legal and ethical college mental health policies, all within a context of adequate resources. It is clear that much more research is needed in all aspects of college mental health. Moreover, education of mental health professionals from many disciplines will become increasingly critical in ensuring adequate numbers of well-trained clinicians to care for the undergraduate and graduate students in the future.

References

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