Chapter 10
Suicide in the Second Half of Life: Cognition and Decision Processes

Katalin Szanto

Abstract The persistent high elderly suicide rates remain an understudied public health problem despite their importance. Suicide, in old age, is often viewed as a rational decision, triggered by loss, illness, disability, and depression. Neither the traditional medical model, which emphasizes the role of psychopathology (especially depression, psychosis, and alcohol and drug abuse), nor the psychosocial models that emphasize the role of social isolation and burdensomeness adequately explains the age-related increase in suicide rates. The importance of different vulnerability factors and certain life-events relative to suicidal behavior may change across the life span. Decision-making deficits due to cognitive decline, and in particular poor cognitive control, are more common in old age. Suicide follows a decision process, and recent studies have shown that suicidal individuals often make disadvantageous decisions in other situations. There is accumulating evidence that impaired cognitive control, deficits in social processing, and impulsivity—expressed in poor decisions both in experimental paradigms and in the context of real-world decision-making—may contribute to the decision to take one's life.

10.1 Introduction

The increase in suicide rates among adolescents in Western countries has drawn much attention in the media and has received research priority, while the persistent high elderly suicide rates remain an understudied public health problem despite their importance (Cardinal 2008). Only recently, the rising suicide rates of the baby-boomer generation (who entered the 50–70 age range) has sparked interest in suicide in the second half of life. In the US, elderly suicide rates decreased from 1991–1999, but the Center for Disease Control reports that suicide rates in individuals aged 45–64 and 65 and older have continued to rise since 2001.

K. Szanto (✉)
Department of Psychiatry, University of Pittsburgh, Pittsburgh, PA 15213, USA
e-mail: szantok@upmc.edu

K.E. Cannon and T.J. Hudzik (eds.), *Suicide: Phenomenology and Neurobiology*,
DOI 10.1007/978-3-319-09964-4_10

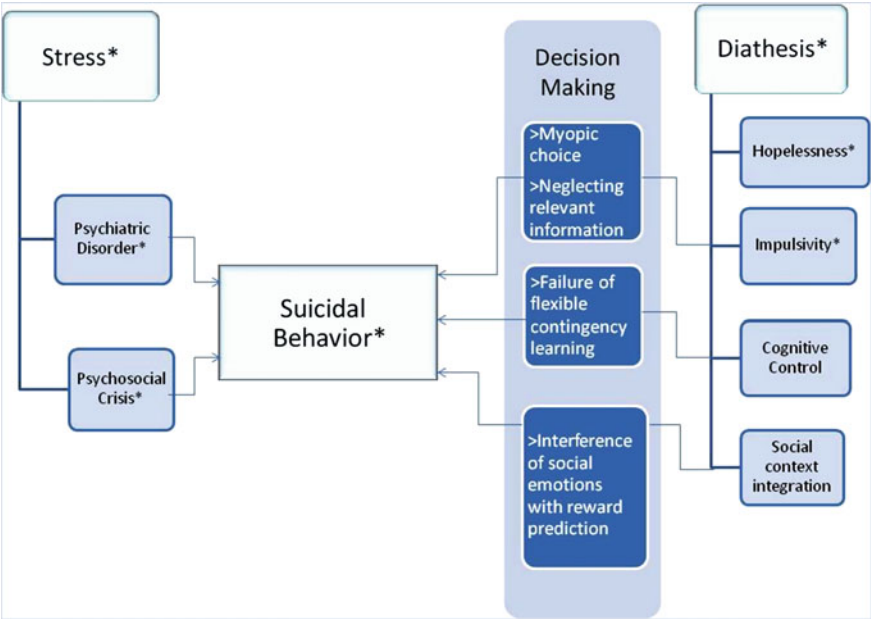

Fig. 10.1 Decision-making in the stress-diathesis model as originally described in Mann (2003)

In particular, suicide rates among men aged 50–59 increased by almost 50 % from 1999 to 2010. Although suicide rates in the United States have decreased over the past two decades, the number of older adults dying by suicide has remained constant, owing to their increased number in the population (Fig. 10.1).

10.2 Epidemiology and Trends

Elderly people have the highest suicide rate in almost all countries in the world where data are available, with the highest suicide rates in persons aged 85 and older (World Health Organization 2005). In many countries such as Hungary, Belarus, and Lithuania, suicide rates increase with age in both genders. However, in other countries, for example in the US and Sri Lanka, the steady increase over the life span is only true for men but not for women. The suicide rates of older men generally surpass that of women with the highest male elderly suicide rates reported in Belarus and Lithuania (approx. 91 per 100,000). In the US, suicide rates among males are highest in the 65+ age group (29.05 suicides per 100,000) and among females, highest in the 45–54 age range (9.34 suicides per 100,000). A different trend exists for Japan, where the highest suicide rate among women is in the 75+

age group (19.4 per 100,000), and the highest rate among men is in the relatively younger 55–64 age range (55.1 per 100,000).

Race and gender are suicide risk modifiers; in the US, African American elders have lower suicide rates than Caucasians, and the suicide rate of elderly men exceeds that of women by 3–1 (Centers for Disease Control and Prevention 2012). Caucasian men over the age of 85 were reported to be at the greatest risk of all age-gender-race groups at 47.3 per 100,000, which is approximately four times the US national suicide rate (11.3 per 100,000). A US study found that men 70 years and older had higher attempt lethality than men 50 years and older (Dombrovski et al. 2008), driven by higher levels of intent. The pattern among women was different, as older women (70+) had lower attempt lethality than those between the ages of 50–69. In the US, firearm suicide rates among males aged 45–64 years were greater than all other suicide methods combined (Centers for Disease Control and Prevention 2012). These trends point to an increasing need to address risk factors that make older adults vulnerable to suicide.

10.2.1 Death by Suicide

A suicide attempt in late life is approximately 25 times more likely to be fatal compared to young adulthood (De Leo et al. 2001). Similar to adolescents and young and middle-aged adults (Mann et al. 1999; Brent et al. 1999), history of suicide attempt is the strongest predictor of death by suicide in old age (Beautrais 2002; Waern et al. 2002a; Conwell et al. 2002). Research experience of recent decades suggests that studies of suicide attempters provide the only practical in vivo window into the biological vulnerability to suicide (Maris et al. 2000). There is, however, considerable skepticism as to how representative suicide attempters are of suicide victims. Indeed, among adolescents and younger adults, the ratio of attempts to completed suicides can be as high as 100:1 (Moscicki 1995). By contrast, this ratio can be as low as 1.2:1 in older men (De Leo et al. 2001), suggesting that elderly suicide attempters may be more similar to those who die of suicide than younger suicide attempters (Pearson and Brown 2000; Frierson 1991). In addition to the fact that the elderly are more likely to be physically frail and live alone than younger adults, the low attempt-to-death ratio is mostly attributed to the fact that older suicide attempters, particularly men over 70, carry out medically serious (high lethality) suicide attempts with a high intent to die (Dombrovski et al. 2008). Thus, it has been proposed that suicidal behavior in old age best approximates lethal suicidal acts. This notion is reinforced by greater clinical and demographic similarity between attempters and suicide victims in older, compared to younger adults (Friedmann and Kohn 2008; De Leo et al. 2001). In summary, attempted suicide in old age is the clinical phenomenon most closely resembling fatal suicidal behavior, thus described as “failed suicide”.

10.2.2 Reattempt, Risk Period

Older adults are more likely to die by suicide within 1 year following a suicide attempt than are younger individuals who made an attempt (Friedmann and Kohn 2008). According to a Finnish study, the first 3 months after hospital discharge represent the highest risk period for reattempts among hospitalized elders (Karvonen et al. 2008). Hawton and Harriss conducted a prospective study investigating repetition of deliberate self-harm and death by suicide in adults aged 60 and older. They followed 730 patients who presented to the hospital after a deliberate self-harm episode for a period of 23 years. Those who had previously attempted suicide were 49 times more likely to die of suicide compared to the demographically similar general population. Nearly three quarters of the sample had high intent during the index episode of self-harm (Hawton and Harriss 2006), which is a greater proportion than found among younger patients.

10.2.3 Age-Specific Diatheses and Stressors

The importance of different vulnerability factors and certain life-events relative to suicidal behavior may change across the life span. Decision-making deficits due to cognitive decline, and in particular poor cognitive control, are more common in old age, while the pathway involving impulsive aggression is more common in young adulthood (McGirr 2008). Bereavement, disability, and pain are often cited as triggering events in old age; in contrast, financial and relationship problems are common motivations in younger age groups.

10.3 Risk Factors Associated with Suicide in the Second Half of Life

10.3.1 Physical Illness

Physical illness and associated disabilities are often cited as motivations for suicide by older suicide attempters, and sometimes mentioned by significant others as a way to rationalize or "understand" the loved ones' suicide. Indeed, research suggests that physical illness is a frequent precipitant to suicidal behavior in older individuals (Waern et al. 2002b; Duberstein et al. 2004b; Harwood et al. 2006). In a sample of 100 suicide victims who were at least 60 years old, Harwood et al. (2006) found that physical illness was one of the three most frequent life problems associated with suicide, along with interpersonal problems and bereavement. This study also noted that pain, breathlessness, and functional limitation were the most frequent physical symptoms associated with death by suicide in late-life. Similarly,

Cattell and Joley found that of the adults aged 65 and older who died by suicide, 43 % used general practitioner services before their death and 23 % had been inpatients in the year preceding their death (Cattell and Jolley 1995). From a prospective study of deliberate self-harm episodes, Hawton and Harriss (2006) identified physical illness as a significant problem in nearly half of the study sample.

Among specific diseases, cancer (Conwell et al. 1990) and diseases associated with breathlessness and pain (Harwood et al. 2006) are the ones most consistently associated with suicide in older adults. Quan et al. (2002) found that cancer, prostate disorders, and chronic pulmonary disease were associated with suicide in the elderly. Waern et al. (2002a) noted that visual impairment, neurological disorders, and malignant disease were associated with increased risk for suicide. Furthermore, using data from 1,354 completed suicides in Ontario, Canada between 1992–2000, Juurlink et al. (2004) found that while many common illnesses—such as congestive heart failure, chronic obstructive lung disease, seizure disorder, urinary incontinence, and moderate to severe pain—were independently associated with an increased risk of suicide in the elderly, the risk was greatest among patients with multiple illnesses.

In contrast to the findings discussed above, an autopsy study conducted by Préville et al. (2005) found no significant difference between health problems reported by suicide victims and controls. However, controls had more functional autonomy than suicide victims had shortly before their deaths.

Physical illness in itself has low predictive value in determining suicide risk, and one should consider other potential vulnerabilities that mediate or accentuate the effect of physical illness on suicidal behavior.

Some studies suggest that gender may play an important role in the extent to which physical illness burden is related to suicidal behavior. Heikkinen and Lonnqvist (1995) found that among victims of suicide aged 60 and older, men had encountered recent somatic illness more often than women. Physical illness may be a stronger risk factor for suicide in men than in women, though it is unclear whether this observation has occurred because studies were underpowered to observe increased suicide risk in women, or because women respond and cope differently to physical illness burden than their male counterparts (Waern et al. 2002b). A psychological autopsy study of late-life suicide victims in which a diagnosis of cancer had played a major role in victims' decisions to end their lives found that all victims were men with a rigid, self-sufficient personality style who had had prior experience with cancer or other debilitating disease (Conwell et al. 1990). Prior to their deaths, victims had expressed fears about cancer-related physical decline, loss of autonomy, stigma of terminal illness, and a fear of becoming a burden to others. They also had diagnosable affective disorders, but had not received mental health care.

Of additional significance in assessing suicide risk is an individual's appraisal of his or her disease burden, including the perceived effect it will have on others and the perceived change on the individual's quality of life. Physical illness could create additional stress for caregivers, reduce functionality, and increase financial strain. Joiner (2002) at al observed that perceived burdensomeness was correlated with

suicide attempter status and with the use of more lethal means of suicide, even after controlling for other relevant dimensions such as a desire to control one's own feelings, a desire to control others, emotional pain, and hopelessness. Suicide risk may be particularly amplified among those who perceive their illness to be progressively worsening or terminal, those who previously witnessed loved ones succumb to the disease, and those who put high value on their independence. Receiving the diagnoses of cancer (Conwell et al. 1990) or AIDS increases the risk of suicide. Two time periods appear to be particularly critical to suicide risk in AIDS patients: when the HIV positive diagnosis is communicated and when cognitive complications first appear (McKegney and O'Dowd 1992).

Duberstein's case-control study reported that suicidal elderly were more likely to perceive their illness as incurable and were also more likely to require in-home assistance, according to proxy respondents (victims' next-of-kin). The effect of physical illness remained even after controlling for current psychiatric disorders (Duberstein et al. 2004). Loebel et al. (1991) noted that anticipation of nursing home placement was cited as a precipitating factor in 44 % of persons within their sample who had given reasons for their completed suicides. Research on the hot-cold empathy gap (Loewenstein 2005) suggests that this may be the case because patients are unable to imagine that they will adapt to changing life circumstances and their acute state of fear, anxiety, or pain immediately following an unfavorable diagnosis will not persist. As such, the decision to end one's life may be state-dependent.

10.3.2 Cognition and Decision-Making

Over the last decade there has been an accumulation of evidence that understanding cognitive deficits and decision processes associated with suicidal behavior and their relationship to other risk factors may help to identify people at risk of suicide, and help to develop individualized treatment strategies. This could be particularly true for older suicidal adults, as accelerated age-related cognitive changes may contribute to the inability to solve problems, and to the ultimate decision to take one's life.

Suicide is a heterogeneous behavior resulting from a convergence of individual vulnerability, state, and environmental pressures. Although there is strong evidence for developmental factors, in most countries, suicide rates peak in late adulthood. Although most elderly suicide attempters and those who die by suicide suffer from depression, only a minority of depressed elders attempt suicide, and clinicians still cannot confidently identify depressed elderly who are most likely to attempt or die by suicide. In addition, loss, illness, and disability typical of aging contribute only modestly to suicide risk, leaving an open question of what other factors may account for this pattern.

10.3.2.1 Cognitive Aging, Decision Processes, and Suicidal Behavior

It remains unclear to what extent accelerated cognitive aging explains higher suicide rates in older adults (Haw et al. 2009). There may be a certain phase of cognitive decline or a particular cognitive profile that predisposes one to suicidal behavior. For example, a Danish population study found a marked increase in suicide rates in dementia patients after an inpatient admission (Erlangsen et al. 2008). It is likely that age-related neurodegenerative and vascular changes (Alexopoulos et al. 1997; Chan et al. 2007) modify older adults' vulnerability to suicide. The ability to make cognitively demanding decisions declines in old age even in non-demented elderly (Denburg et al. 2007). Older adults are more likely to be the victims of misleading advertising or other scams, and also make less advantageous decisions in the laboratory than younger individuals (Fein et al. 2007; Brown and Ridderinkhof 2009). This is partly explained by an age-related decline in cognitive control (MacPherson et al. 2002), related to the disproportionate effect of aging on the prefrontal cortex (Raz et al. 2005).

Originally described by Mann (2003), the stress-diathesis model differentiates temporary stressors such as psychosocial strain and mood states from a stable diathesis encompassing heritable impulsive-aggressive traits and hopelessness. An emerging literature suggests that the tendency to make disadvantageous decisions is the link between some aspects of the diathesis and suicidal behavior. Early studies described suicide attempters as poor problem solvers and the suicidal crisis as a state with low-level, concrete thinking, increased impulsivity, and a focus on immediate goals, where consequences of the attempt are not considered. There is increasing evidence to support the view that the suicide diathesis involves cognitive deficits and maladaptive decision-making. Extending the stress-diathesis model, we propose that the trait-like diatheses—impaired cognitive control, deficits in social processing, and impulsivity—are expressed in poor decisions.

10.3.2.2 Decision-Making Biases as a Link Between the Stable Diathesis and the Suicidal Crisis

Providing initial evidence, Jollant and colleagues found impaired decision-making on the Iowa Gambling Task in euthymic younger suicide attempters with mood disorders: suicide attempters failed to switch from high-initial payoff, high-loss options to low-initial payoff, long-term winning options (Jollant et al. 2005). Studies replicated these findings in younger (Bridge et al. 2006) and bipolar (Malloy-Diniz et al. 2009) patients; however, there was a negative report as well (Oldershaw et al. 2009). A similar decision-making task without working memory demands (Cambridge Gambling Task), (Clark et al. 2011) showed decision-making impairment in older suicide attempters compared to depressed non-suicidal and healthy controls. While these findings support the notion of altered decision-making in suicide attempters, the mechanisms of impairment on such a complex task remain unclear.

10.3.2.3 Cognitive Control Deficits and High-Lethality Suicide Attempts

Population studies have linked poor cognitive abilities (Andersson et al. 2008; Gunnell et al. 2011) to suicidal behavior. Deficits in cognitive control represent the most consistent finding in both middle-aged (Keilp et al. 2008, 2001; Marzuk et al. 2005; Raust et al. 2007; Nock et al. 2010) and older (Gujral et al. 2012; McGirr et al. 2012a; Richard-Devantoy et al. 2012) suicide attempters, as well as in euthymic first-degree relatives of suicide victims (McGirr et al. 2012a). Cognitive control is the active maintenance of patterns of activity that represent goals and the means to achieve them (Miller and Cohen 2001). This construct is related to the older term *executive function*. In the domain of decision-making, cognitive control is required to represent goals and to organize information about rewards, punishments, and available actions. Interference control, measured by the Stroop, appears to be a particularly sensitive index (Richard-Devantoy 2011; Keilp et al. 2013), related to higher lethality of suicide attempts (Keilp et al. 2001, 2013, 2008). One study found a relationship between high-lethality suicide attempts and poor cognitive control, as assessed by the Wisconsin Card Sort (McGirr et al. 2012; Dombrovski et al. 2011, 2013), independent of medication exposure, substance use disorders, and possible brain injury from suicide attempts. It is unclear, however, if these deficits are selective, and whether attention and working memory are also affected (Dougherty et al. 2004; Keilp et al. 2008). Our studies show that a basic deficit in cognitive control, which undermines decision-making in complex environments, is linked to high-lethality suicide attempts. Poor decision-making can result from several distinct decision-making biases, suggesting the existence of different pathways or subgroups en route to suicidal decisions. One of the pathways has been linked to impulsivity.

10.3.2.4 Decision-Making Deficits Related to Impulsivity in Late-Life Suicide

Impulsivity is a complex, multidimensional construct (Klonsky and May 2010; Kirby and Finch 2010; Dougherty et al. 2004). Dougherty and colleagues proposed that impulsivity includes at least three testable components: response initiation prior to complete processing, response inhibition, and myopic choice (Dougherty et al. 2009, 2010). Risk-taking impulsivity is also often considered as a separate component. It is possible that the importance of these components vary across the life-cycle in suicidal individuals, given the larger cooccurrence of substance abuse and conduct disorder in younger compared to older suicide attempters. Using Kirby's Monetary Choice Questionnaire (Kirby 1997), Dombrovski and colleagues (Dombrovski et al. 2011) found that the preference for immediate reward over larger delayed reward, i.e., myopic choice, differentiated between low lethality (mostly impulsive) and high lethality (mostly premeditated) suicidal acts. The same group also reported that older suicide attempters neglected key information when making decisions (Dombrovski

et al. 2013), linking specific decision-making patterns to low-medical lethality, poorly planned attempts (Dombrovski et al. 2011, 2013).

10.3.2.5 Social Cognition and Social Decision-Making

Lack of feeling connected (Duberstein et al. 2004b) and poor social problem solving (Gibbs et al. 2009) have been described in older suicide attempters. However, cognitive substrates of this apparent social impairment in suicide attempters remain unknown. Social cognition (i.e., the encoding, storage, retrieval, and application of social information) is a prerequisite of social understanding and empathy. One possible deficit, the inability to recognize others' complex emotional states has been observed not only in disorders characterized by prominent social deficits (autism-spectrum disorders and frontotemporal dementia), but also in depression, alcohol dependence, and in normal aging. Szanto and colleagues reported that older suicide attempters committed significantly more errors in social emotion recognition and showed poorer global cognitive performance than elders with no psychiatric history (Szanto et al. 2012). Attempters had restricted social networks: they were less likely to talk to their children, had fewer close friends, and did not engage in volunteer activities, compared to nonsuicidal depressed elders and those with no psychiatric history.

Suicide is often a solution to mounting conflicts, albeit at a catastrophic personal cost. Economic bargaining games can model social influences on decision-making. These tasks are beginning to shed light on social decision processes in psychiatric illness (King-Casas and Chiu 2012; Kishida et al. 2010), such as distrust in borderline personality disorder; however, so far there has been only one study that investigated social decision-making in suicidal individuals. Using an economic bargaining game that involves unfairness (the Ultimatum Game), Szanto and colleagues found that suicidal elderly, in particular high medical lethality suicide attempters, had disadvantageous tendencies in resolving conflicts on this game (Szanto et al. 2013a). In contrast to the control groups and low-medical lethality suicide attempters, they did not adjust their responses to unfairness based on the money at stake. One of the deficits that may contribute to these patterns of suboptimal social decision-making is social interference of emotions with reward prediction. Indeed, maladaptive interference of social emotions in striatal reward responses during an economic exchange have been described (Delgado et al. 2005).

10.3.3 Social Connectedness

Research has shown that poor social connectedness, or the lack of enduring, stable interpersonal relationships, can amplify the risk for suicide in older adults. Suicidal behavior and social connectedness have been linked through several subjective

indicators such as social isolation and perceived sense of loneliness, and objective indicators such as living alone and the loss of loved ones.

Subjective indicators of social connectedness include the individual's own perception of social supports and interactions. Using the Interpersonal Theory of Suicide proposed by Joiner et al. (2009), Van Orden (Van Orden et al. 2010) suggests that a thwarted sense of belongingness is one of the subjective constructs that contribute significantly to suicide risk. Prolonged loneliness and the absence of reciprocally caring relationships can induce negative emotional and interpersonal states, which may result in suicidal ideation or behavior. Kissane and McLaren note that adults who report a higher sense of belonging cite a greater number of reasons for living, which may be linked to reduced risk for suicide. (Kissane and McLaren 2006). Harrison et al. (2010) found that suicidal elderly report lower levels of perceived support and prolonged interpersonal difficulties. This is consistent with the idea that depressed elderly are typically characterized as dealing with rejection or criticism poorly/incompetently. Perceived weak social supports and deteriorating relationships could result in guilt and feelings of worthlessness, which in turn could increase their likelihood of considering suicide. The findings also suggest a persistent pattern of hostility, sensitivity, and ambivalence in interpersonal relationships, which could be associated with high rigidity and inflexibility common in elderly people who may be at high risk for suicide. Poor social integration and perceived lack of community support were also found by Dennis and his colleagues (Dennis et al. 2005) to be important in predicting suicidal behavior. In somewhat similar findings, Awata et al. (2005) showed that lack of perceived 'instrumental support' related to inability to function independently could lead to increased suicidal thinking.

Adults in this phase of life typically experience a range of stressful events such as loss of a spouse or loved ones, retirement, change in living arrangements, and physical illness that serve as objective indicators of social connectedness. Support from family and friends during such events is important in order to cope effectively with these stressors and to serve as a "buffer" against their negative impact. Harwood et al. (2006) suggest that suicidal individuals experience more problems related to bereavement. Chronic distress due to loss of a spouse or loved one can pose as a risk factor for suicide. Our study found that complicated grief resulting from bereavement is an important indicator of suicidal ideation in the elderly (Szanto 1997). Vanderhorst and McLaren (2010) explored states of relatedness in adults 65 or older and found that limited availability of social support was associated with higher levels of depression and suicidal ideation. Duberstein et al. (2004b) found that those who died from suicide were more likely to be unemployed, widowed or single/divorced, and less likely to have had siblings or children. They were also less likely to have been engaged in community activities or social networks. Our findings found associations between suicide risk and subjective as well as objective indicators of social connectedness. Even after accounting for other factors such as depression and physical illness burden, suicidal elderly were found to have more disruptive interpersonal relationships and restricted social networks than non-suicidal elderly. They reported lower levels of belonging, tangible support, and were less likely to maintain regular contact with their children (Szanto et al. 2012).

There is some evidence that making resources available can improve these subjective and objective indicators that affect social connectedness among the elderly. De Leo et al. (2002) and Oyama et al. (2005) show that intervention methods and community programs that bolster social connectedness may have a positive impact on the elderly and prevention of suicide.

10.3.4 Socioeconomic Status and Suicidal Behavior

Low socioeconomic status may be a risk factor for suicide, both as a chronic stressor in itself and as a potential barrier to accessing treatment (Cohen et al. 2009). Some research also suggests that individuals of lower socioeconomic status may be more likely to report suicidal ideation at the beginning and throughout the treatment of late-life depression (Cohen et al. 2006).

Interestingly, some evidence suggests that employment status may be more relevant to suicidal behavior than pure socioeconomic status. Cubbin et al. (2000) noted that in a noninstitutionalized civilian US sample, no significant difference was found in the risk of suicide by income or education after adjustment for other relevant characteristics (e.g., age, race, sex, ethnicity). However, those not in the labor force were more than twice as likely to die from suicide compared to white-collar workers (adults?). Lewis and Sloggett (1998) similarly noted that the association between suicide and unemployment was stronger than the association with other socioeconomic measures in a representative 1 % sample of the population in England and Wales in which census variables were linked to mortality data. Blakely et al. (2003) found that among 2 million respondents to the New Zealand 1991 census aged 25–64, being unemployed was associated with a two- to three-fold increased relative risk of death by suicide compared to being employed. The authors note that about half of the association might be confounded by mental illness.

Research by Link et al. (1993) goes further, suggesting that the relationship between socioeconomic status and depression/distress (but not explicitly suicide) is linked to the social causation model, which states that increased education, occupational prestige, and the degree to which one is able to exercise direction, control, and planning (i.e., autonomy) in one's occupation is protective against depression.

Indeed, while some studies have tried to parse out the cause/effect bi-directional relationship between lower socioeconomic status and mental illness, our search suggested no studies have examined suicide in this context specifically.

10.3.5 Personality Pathology and Late-Life Suicide

Personality disorders (PDs)—especially borderline personality disorder—are associated with high impulsivity (Wilson et al. 2007), emotion regulation difficulties (Bornovalova et al. 2008), and suicidal behavior (Wilson et al. 2006). The

prevalence rate of PDs and severe personality pathology among older adults who attempt or complete suicide is reported to be lower (Henriksson et al. 1995; Harwood et al. 2001; Blasco-Fontecilla et al. 2009) than the prevalence rate of PDs among younger suicide attempters or completers (Henriksson et al. 1995), and the rate of cluster B PDs is relatively low as well (Abrams and Horowitz 1999, 1996). Nonetheless, the presence of a PD confers increased risk for suicide attempt and completion among older adults (Harwood et al. 2001). In psychological autopsy studies, low openness to experience (Duberstein et al. 2004) and anxious and obsessional (anankastic) personality accentuation (Harwood et al. 2001) have been associated with death by suicide in late life. Personality features may alter or attenuate with age. The lack of agreement regarding the role of PDs in late-life suicide may indicate heterogeneity: it is possible that both emotionally inflexible and emotionally labile elderly are at risk. There is also some evidence for an association between suicide attempts and impulsivity; these data were collected primarily from self-report measures (McGirr et al. 2008) and are primarily from young adult groups (Horesh 2001). A study by Wilson and colleagues (Wilson et al. 2007) using the Barratt Impulsiveness Scale reported greater non-planning impulsiveness in patients with borderline PD than in patients without borderline PD, independent of Axis I diagnoses. Among people with PDs, more "impulsive" individuals are not necessarily at higher risk for suicide (Soloff et al. 2005). Some studies even find lower impulsivity in people who commit the most serious suicidal acts and demonstrate the greatest degree of 5HT vmPFC abnormalities (Oquendo et al. 2003; Soloff et al. 2005). Trait impulsivity may decline with age (Stepp and Pilkonis 2008): studies of late-life attempters report lower impulsivity (McGirr et al. 2008) and higher degrees of premeditation compared to younger suicide attempters. In summary, personality factors seem to play a smaller role in late-life suicide than in mid-life suicide, and specific personality profiles that predispose individuals to suicidal behavior in old age remain poorly understood.

10.4 Treatment and Prevention

10.4.1 Intervention and Prevention

There are a number of both promising and already proven treatment strategies that focus on reducing depression and suicidal behavior in the elderly (While et al. 2012). Similar to other age groups, evidence supports approaches that focus on high suicide risk groups, such as the early detection and effective treatment of those with mental health problems, increased outreach to depressed and homebound older adults (especially those with a history of suicidal behavior), education of treatment providers, and restriction of lethal means (Mann et al. 2005; Szanto et al. 2007; Lapierre et al. 2011). In addition, the elderly in particular would greatly benefit from resilience training, improved coping mechanisms, and positive aging schemas

(Szanto et al. 2013). However, research on suicide prevention and treatment in this age group is limited due to the underrepresentation of elderly in suicide studies. A systematic review conducted by Lapierre and colleagues observed that, out of 149 publications on suicide prevention or intervention programs, only 19 focused on older adults (Lapierre et al. 2011). The lack of research in suicide prevention in old age contrasts sharply with the fact that, in most countries worldwide, elderly people have the highest suicide rates (World Health Organization) and many suicidal depressed older adults have difficult-to-treat depression (Szanto et al. 2003).

Five main categories emerged among the programs in Lapierre's review: primary care interventions, community-based outreach, telephone counseling, clinical treatment, and resilience training. Older adults who die by suicide are more likely to have been seen by primary care providers than by mental health professionals; therefore, practitioners require training and support in the assessment and management of suicidal patients. Promising primary care interventions trials include the PROSPECT (Prevention of Suicide in Primary Care Elderly: Collaborative Trial) (Bruce et al. 2004) and IMPACT (Improving Mood: Promoting Access to Collaborative Treatment) (Unutzer et al. 2002) studies. The PROSPECT study tested the effectiveness of elderly-focused care management intervention strategies, and found that the intervention group had a greater reduction in depressive symptoms, as well as a faster decline in suicidal ideation than the standard control care group (Bruce et al. 2004). Patients of the IMPACT intervention received access to a depression care manager who offered treatments including antidepressant management and psychotherapy. Compared to patients receiving standard care, those enrolled in IMPACT's intervention arm had significantly fewer depressive symptoms, exhibited less functional impairment, and reported a higher quality of life (Unutzer et al. 2002). The successes of PROSPECT and IMPACT indicate that there are more beneficial means of treatment than standard care for elderly patients afflicted with depressive disorders. However, the effectiveness of these trials was limited to the improvement of suicidal ideation and both trials were underpowered to show differences in suicidal behavior in the treatment arms vs. standard care. Of the clinical treatments, the Lapierre review mentions only the study by Szanto et al. (2003). This study found that suicidal ideation improved in both the antidepressant only and in the combined intervention arms (medication plus interpersonal psychotherapy). However, those who had high suicide risk (evidenced by current suicidal ideation or a history of suicide attempt), or recurrent thoughts of death (moderate suicide risk), were less likely to respond to treatment and they needed significantly longer time to remit from depression (median time to response, 6 and 5 vs 3 weeks) than low-suicide risk elders.

Of the community-based outreach programs, Lapierre et al. found that mental-health workshops run by municipal public health organizations that focused on strengthening social support showed a decrease in the suicide rate of older women (Chiu et al. 2003; Oyama et al. 2005). In men, there was no statistically significant difference at follow-up, suggesting that community-based suicide prevention programs still are not efficient for older men, who have much higher suicide rates than older women.

Telephone counseling, in the form of both a 24-h emergency number and a twice-weekly support call offered to elderly users, resulted in a significant decrease in the number of completed suicides among the elderly relative to the region's expected suicide rate (De Leo et al. 1995, 2002; Fiske and Arbore 2001; Morrow-Howell et al. 1998). Participants also reported less severe depression, improved psychosocial functioning, and required less home visits by GPs. However, like the community-based programs, these results held only for women.

Two studies of resilience training (Lapierre et al. 2007; Heisel et al. 2009) were included in the review. Lapierre et al. (2007) focused on increasing the meaningfulness of life among the patients, and the Heisel et al. (2009) study provided interpersonal psychotherapy to improve social functioning skills. Both studies reported that the experimental group had a decrease in depressive symptoms, and in the Lapierre study, a significant portion of the participants reported a complete absence of suicidal ideation by the end of the intervention.

There is lack of studies on substance abuse and suicidal behavior in this age group. It is unclear whether alcohol and drugs (including prescription opioids) contribute to an increased risk of suicide in the baby-boomer generation in the US. The underlying difficulty of developing tailored and personalized treatment options may also be linked to a lack of treatment access and stigma surrounding mental disorders in general and suicidality in particular. These factors may explain why a large portion of the old age population in need of psychiatric interventions does not seek out mental health facilities. By providing additional settings for suicide assessment that stray from traditional locations, e.g., integrated clinics for physical and mental diseases, elderly may be increasingly able to receive treatment. Potential approaches for this age group may also include online resources, which could be especially advantageous for those adults who are very isolated or frail. These new technologies would offer baby-boomer generations a more accessible and private means of independent initiation into a treatment plan. With the development of these online resources, attempts are being made to provide more effective self-testing, crisis-intervention, safety planning, and other means of support to those suffering from suicidality (Mishara and Côté 2013). In summary, long-term programs that integrate preventive interventions at multiple levels will be the most effective.

10.4.2 Psychotropic Medications and Suicidal Behavior

Although the oldest age groups have the highest suicide rate and the majority of older suicide attempters and completers suffer from depression (Conwell and Brent 1995; Waern et al. 2003) they have the lowest percentage of antidepressant use (Abrams et al. 2009) in the US and elsewhere. In addition, there is some indication that older depressed suicidal adults may benefit the most from adequate antidepressant treatment compared to younger adults (Kalmar et al. 2008). The FDA meta-analyses (Stone et al. 2009) also highlighted the beneficial effects of

antidepressants in the elderly population and concluded that there is no indication of antidepressant-related increased suicide risk in older age groups.

In contrast, sedatives and hypnotics should be used with more caution in suicidal elderly. A case-control study performed by Carlsten and Waern 2009) found a significant increase in suicide risk among elderly users of sedatives and/or hypnotics, and no increase of risk in elderly users of SSRIs. Possible causes of the increased risk include the triggering of uncharacteristic aggressive behavior, adverse reactions between the medication and alcohol, and the possibility that the medication was used as a means to commit suicide. Carlsten and Waern stress that the increased suicide risk among elderly calls for an evaluation of suicide risk prior to prescribing hypnotics or sedatives.

References

Abrams RC, Horowitz SV (1996) Personality disorders after age 50: a meta-analysis. J Personality Disord 10:271–281

Abrams RC, Horowitz SV (1999) Personality disorders after age 50: a meta-analytic review of the literature. In: Rosowsky E, Abrams RC, Zweig RA (eds) Personality disorders in older adults: emerging issues in diagnosis and treatment. Psychology Press

Abrams RC et al (2009) Antidepressant use in elderly suicide victims in New York City: an analysis of 255 Cases. J Clin Psychiatry Print

Alexopoulos GS et al (1997) Vascular depression' hypothesis. Arch Gen Psychiatry 54.10:915–922 (Print)

Abrams RC, Sandra V (1996) Personality disorders after age 50: a meta-analysis. J Pers Disord 10.3:271–281 (Print)

Andersson L et al (2008) Association of Iq scores and school achievement with suicide in a 40-year follow-up of a Swedish Cohort. Acta Psychiatrica Scandinavica 118.2:99–105 (Print)

Awata S et al (2005) Factors associated with suicidal ideation in an elderly Urban Japanese population: a community-based, cross-sectional study. Psychiatry Clinic Neurosci 59.3:327–36 (Print)

Beautrais AL (2002) A case control study of suicide and attempted suicide in Older Adults. Suicide Life-Threatening Behav 32.1:1–9 (Print)

Blakely TA, Sunny CDC, June A (2003) Unemployment and suicide. evidence for a causal association? J Epidemiol Commun Health 57.8:594–600 (Print)

Blasco□Fontecilla H et al (2009) Severity of personality disorders and suicide attempt. Acta Psychiatrica Scandinavica 119.2:149–55 (Print)

Bornovalova MA et al (2008) A multimodal assessment of the relationship between emotion dysregulation and borderline personality disorder among inner-city substance users in residential treatment. J Psychiatric Res 42.9:717–726 (Print)

Brent DA et al (1999) Age- and sex-related risk factors for adolescent suicide. J Am Acad Child Adolesc Psychiatry 38.12:1497–505 (Print)

Bridge JA, Goldstein TR, Brent DA (2006) Adolescent suicide and suicidal behavior. J Child Psychol Psychiatry 47.3–4:372–394 (Print)

Brown SBRE, Ridderinkhof KR (2009) Aging and the neuroeconomics of decision making: a review. Cogn Affect Behav Neurosci 9.4:365–379 (Print)

Bruce ML et al (2004) Reducing suicidal ideation and depressive symptoms in depressed older primary care patients: a randomized controlled trial (See Comment). JAMA 291.9:1081–1091 (Print)

Cardinal C (2008) Three decades of suicide and life-threatening behavior: a bibliometric study. Suicide Life-Threat Behav 38.3:260–273 (Print)
Carlsten A, Margda W (2009) Are sedatives and hypnotics associated with increased suicide risk of suicide in the elderly? BMC Geriatr 9.1:20(Print)
Cattell, H, David JJ (1995) One hundred cases of suicide in elderly people. British J Psychiatry 166.4:451–457 (Print)
Centers for Disease Control and Prevention, National Center for Injury Prevention and Control (2012) National suicide statistics at a glance. May 11, 2012. Web. August 9, 2013
Chan SS, Lyness JM, Conwell Y (2007) Do cerebrovascular risk factors confer risk for suicide in later life? a case-control study. Am J Geriatr Psychiatry 15.6:541–544 (Print)
Clark L et al (2011) Impairment in risk-sensitive decision-making in older suicide attempters with depression. Psychol Aging 26.2:321–330 (Print)
Cohen A et al (2006) Social inequalities in response to antidepressant treatment in older adults. Arch Gen Psychiatry 63.1:50–56 (Print)
Cohen A et al (2009) Socioeconomic status and anxiety as predictors of antidepressant treatment response and suicidal ideation in older adults. Soc Psychiatry Psychiatr Epidemiol 44.4:272–277 (Print)
Conwell Y, David B (1995) Suicide and aging i: patterns of psychiatric diagnosis. Int Psychogeriatr 7.2:149–164 (Print)
Conwell Y, Duberstein PR, Caine ED (2002) Risk factors for suicide in later life. Biol Psychiatry 52.3:193–204 (Print)
Conwell Y, Eric DC, Kurt O (1990) Suicide and cancer in late life. Hosp. Commun Psychiatry 41.12:1334–1338 (Print)
Cubbin C, Felicia BL, Gordon SS (2000) Socioeconomic status and the occurrence of fatal and nonfatal injury in the United States. Am J Public Health 90.1:70 (Print)
De Leo D, Carollo G, Dello Buono M (1995) Lower suicide rates associated with a tele-help/tele-check service for the elderly at home. Am J Psychiatry 152.4:632–634 (Print)
De Leo D, Dello Buono M, Dwyer J (2002) Suicide among the elderly: the long-term impact of a telephone support and assessment intervention in Northern Italy. British J Psychiatry 181:226–229 (Print)
De Leo D et al (2001) Attempted and completed suicide in older subjects: results from the who/euro multicentre study of suicidal behaviour. Int J Geriatr Psychiatry 16.3:300–310 (Print)
Delgado MR, Frank RH, Phelps EA (2005) Perceptions of moral character modulate the neural systems of reward during the trust game. Nature Neurosci 8.11: 1611–1618 (Print)
Denburg NL et al (2007) The orbitofrontal cortex, real-world decision making, and normal aging. Ann New York Acad Sci 1121:480–498 (Print)
Dennis M et al (2005) Self-harm in older people with depression. British J Psychiatry 186:538–539 (Print)
Dombrovski AY et al (2008) Sex differences in correlates of suicide attempt lethality in late life. Am J Geriatr Psychiatry 16.11:905–913 (Print)
Dombrovski AY et al (2011) Lethal forethought: delayed reward discounting differentiates high- and low-lethality suicide attempts in old age. Biol Psychiatry 70.2:138–44 (Print)
Dombrovski AY et al (2013) Reward signals, attempted suicide, and impulsivity in late-life depression. JAMA Psychiatry (Print)
Dougherty DM et al (2004) Laboratory measured behavioral impulsivity relates to suicide attempt history. Suicide Life Threatening Behav 34.4:374–385 (Print)
Dougherty DM et al (2009) Distinctions in behavioral impulsivity: implications for substance abuse research. Addict Dis Treat 8.2:61–73 (Print)
Dougherty DM et al (2010) Effects of acute tryptophan depletion on three different types of behavioral impulsivity. Int J Tryptophan Res 3:99–111 (Print)
Duberstein PR, Conwell Y, Caine ED (2004) Age differences in the personality characteristics of suicide completers: preliminary findings from a psychological autopsy study. Psychiatry 57.3:213–224 (Print)

Duberstein PR et al (2004a) Suicide at 50 years of age and older: perceived physical illness, family discord and financial strain. Psychol Med 34.1:137–146 (Print)
Duberstein PR et al (2004b) Poor social integration and suicide: fact or artifact? a case-control study. Psychol Med 34.7:1331–1337 (Print)
Erlangsen A, Zarit SH, Conwell Y (2008) Hospital-diagnosed dementia and suicide: a longitudinal study using prospective, nationwide register data. Am J Geriatr Psychiatry 16.3:220–228 (Print)
Fein G, McGillivray S, Finn P (2007) Older adults make less advantageous decisions than younger adults: cognitive and psychological correlates. J Int Neuropsychol Soc 13.3:480–489 (Print)
Fiske A, Patrick A (2001) Future directions in late life suicide prevention. Omega-Detroit New York 42.1:37–54 (Print)
Friedmann H, Kohn R (2008) Mortality, or probability of death, from a suicidal act in the United States. Suicide Life Threat Behav 38.3:287–301 (Print)
Frierson RL (1991) Suicide attempts by the old and the very old. Archiv Intern Med 151.1:141 (Print)
Gibbs LM et al (2009) When the solution is part of the problem: problem solving in elderly suicide attempters. Int J Geriatric Psychiatry 24.12:1396–404 (Print)
Gujral S et al (2012) Impaired executive function in contemplated and attempted suicide in late life. Am J Geriatric Psychiatry (Print)
Gunnell D et al (2011) School performance and risk of suicide in early adulthood: follow-up of two national cohorts of swedish schoolchildren. J Affect Dis 131.1–3:104–112 (Print)
Harrison KE et al (2010) Alone? perceived social support and chronic interpersonal difficulties in suicidal elders. Int Psychogeriatr 22.3:445–454 (Print)
Harwood D et al (2001) Psychiatric disorder and personality factors associated with suicide in older people: a descriptive and case-control study. Int J Geriatric Psychiatry 16.2:155–165 (Print)
Harwood D et al (2006) Life problems and physical illness as risk factors for suicide in older people: a descriptive and case control study. Psychol Med 36.9:1265–1274 (Print)
Haw C, Harwood D, Hawton K (2009) Dementia and suicidal behavior: a review of the literature. Int Psychogeriatr 21.3:440–453 (Print)
Hawton K, Harriss L (2006) Deliberate self-harm in people aged 60 years and over: characteristics and outcome of a 20-year cohort. Int J Geriatr Psychiatry 21.6:572–581 (Print)
Heikkinen ME, Jouko K (1995) Recent life events in elderly suicide: a nationwide study in Finland. Int Psychogeriatr 7.2:287–300 (Print)
Heisel MJ et al (2009) Adapting interpersonal psychotherapy for older adults at risk for suicide: preliminary findings. Prof Psychol: Res Pract 40.2:156 (Print)
Henriksson MM et al (1995) Mental disorders in elderly suicide. Int Psychogeriatr 7.2:275–286 (Print)
Horesh N (2001) Self-report versus computerized measures of impulsivity as a correlate of suicidal behavior. Crisis 22.1:27–31 (Print)
Joiner TE et al (2002) Perceived burdensomeness and suicidality: two studies on the suicide notes of those attempting and those completing suicide. J Soc Clin Psychol 21.5:531–545 (Print)
Joiner TE Jr et al (2009) The interpersonal theory of suicide: guidance for working with suicidal clients. American Psychological Association (Print)
Jollant F et al (2005) Impaired decision making in suicide attempters. Am J Psychiatry 162.2:304–310 (Print)
Juurlink DN et al (2004) Medical illness and the risk of suicide in the elderly. Arch Intern Med 164.11:1179–1184 (Print)
Kalmar S et al (2008) Antidepressant prescription and suicide rates: effect of age and gender. Suicide Life Threat Behav 38.4:363–74 (Print)
Karvonen K et al (2008) Suicide after hospitalization in the elderly: a population based study of suicides in Northern Finland between 1988–2003. Int J Geriatric Psychiatry 23.2:135–141 (Print)

Keilp JG et al (2001) Neuropsychological dysfunction in depressed suicide attempters. Am J Psychiatry 158.5:735–741 (Print)
Keilp JG et al (2008) Attention deficit in depressed suicide attempters. Psychiatry Res 159.1–2:7–17 (Print)
Keilp JG et al (2013) Neuropsychological function and suicidal behavior: attention control, memory and executive dysfunction in suicide attempt. Psycholog Med 43.3:539–551 (Print)
King-Casas B, Chiu PH Understanding interpersonal function in psychiatric illness through multiplayer economic games. Biol Psychiatry 72.2:119–25 (Print)
Kirby KN (1997) Bidding on the future: evidence against normative discounting of delayed rewards. J Exp Psychology-General 126.1:54–70 (Print)
Kirby KN, Finch JC (2010) The hierarchical structure of self-reported impulsivity. Person Individual Differ 48.6:704–713 (Print)
Kishida KT, King-Casas B, Montague PR (2010) Neuroeconomic approaches to mental disorders. Neuron 67.4:543–554 (Print)
Kissane M, McLaren S (2006) Sense of belonging as a predictor of reasons for living in older adults. Death Stud 30.3:243–258 (Print)
Klonsky ED, May A (2010) Rethinking impulsivity in suicide. Suicide Life Threat Behav 40.6:612–619 (Print)
Lapierre S et al (2007) Addressing suicidal ideations through the realization of meaningful personal goals. Crisis: J Crisis Intervent Suicide Prevent 28.1:16–25 (Print)
Lapierre S et al (2011) A systematic review of elderly suicide prevention programs. Crisis: J Crisis Interv Suicide Prev 32.2:88–98 (Print)
Lewis G, Andy S (1998) Suicide, deprivation, and unemployment: record linkage study. Bmj 317.7168:1283–1286 (Print)
Link BG, Mary Clare L, Bruce PD (1993) Socioeconomic status and depression: the role of occupations involving direction, control, and planning. Am J Sociol 98.6:1351–1387 (Print)
Loebel JP et al (1991) Anticipation of nursing home placement may be a precipitant of suicide among the elderly. J Am Geriatrics Soc (Print)
Loewenstein G (2005) Hot-cold empathy gaps and medical decision making. Health Psychol 24.4S:S49 (Print)
MacPherson SE, Phillips LH, Della Sala S (2002) Age, executive function and social decision making: a dorsolateral prefrontal theory of cognitive aging. Psychol Aging 17.4:598–609 (Print)
Malloy-Diniz LF et al (2009) Suicide behavior and neuropsychological assessment of type i bipolar patients. J Affect Dis 112.1–3:231–236 (Print)
Mann JJ (2003) Neurobiology of suicidal behaviour. Nature Rev Neurosci 4.10:819–828 (Print)
Mann JJ et al (1999) Toward a clinical model of suicidal behavior in psychiatric patients. Am J Psychiatry 156.2:181–189 (Print)
Mann JJ et al (2005) Suicide prevention strategies: a systemic review. JAMA 294.16:2064–2074 (Print)
Maris RW et al (2000) Comprehensive textbook of suicidology, 1st edn. Guilford Press (Print)
Marzuk PM et al (2005) Executive functioning in depressed patients with suicidal ideation. Acta Psychiatrica Scandinavica 112.4:294–301 (Print)
McGirr A et al (2008) Impulsive-aggressive behaviours and completed suicide across the life cycle: a predisposition for younger age of suicide. Psychol Med 38.3:407–417 (Print)
McGirr A et al (2012) Deterministic learning and attempted suicide among older depressed individuals: cognitive assessment using the wisconsin card sorting task. J Psychiatric Res 46.2:226–32 (Print)
McGirr AFJ, Turecki G (2012) Neurocognitive alterations in first degree relatives of suicide completers. J Affect Dis (Print)
McKegney F, Mary AO (1992) Suicidality and hiv status. Am J Psychiatry 149.3:396–398 (Print)
Miller EK, Cohen JD (2001) An integrative theory of prefrontal cortex function. Ann Rev Neurosci 24:167–202 (Print)

Mishara BL, Côté L-P (2013) Suicide prevention and new technologies: towards evidence based practice. Suicide Prevent New Technol 1 (Print)
Morrow-Howell N, Susan B-K, Lee J (1998) Evaluating an intervention for the elderly at increased risk of suicide. Res Soc Work Pract 8.1:28–46 (Print)
Moscicki EK (1995) Epidemiology of suicide. Int Psychogeriatr 7.2:137–48 (Print)
Nock MK et al (2010) Measuring the suicidal mind: implicit cognition predicts suicidal behavior. Psycholog Sci 21.4:511–517 (Print)
Oldershaw A et al (2003) Decision making and problem solving in adolescents who deliberately self-harm. Psychol Med 39.1:95–104 (Print)
Oquendo MA et al (2003) Positron emission tomography of regional brain metabolic responses to a serotonergic challenge and lethality of suicide attempts in major depression. Archiv Gen Psychiatry 60.1:14–22 (Print)
Oyama H et al (2005) Community-based suicide prevention through group activity for the elderly successfully reduced the high suicide rate for females. Psychiatry Clin Neurosci 59:337–355 (Print)
Pearson JL, Brown GK (2000) Suicide prevention in late life: directions for science and practice. Clin Psychol Rev 20.6:685–705 (Print)
Préville M et al (2005) Physical health and mental disorder in elderly suicide: a case-control study. Aging Mental Health 9.6:576–584 (Print)
Quan H et al (2002) Association between physical illness and suicide among the elderly. Soc Psychiatry Psychiatr Epidemiol 37.4:190–197 (Print)
Raust A et al. (2007) Prefrontal cortex dysfunction in patients with suicidal behavior. Psychol Med 37.3:411–4199 (Print)
Raz N et al (2005) Regional brain changes in aging healthy adults: general trends, individual differences and modifiers. Cereb Cortex 15.11: 676–689 (Print)
Richard-Devantoy S et al (2011) P03-470—cognitive inhibition in suicidal depressed elderly. Eur Psychiatry 26.1:1640 (Print)
Richard-Devantoy S et al (2012) Deficit of cognitive inhibition in depressed elderly: a neurocognitive marker of suicidal risk. J Affect Dis140.2:193–99 (Print)
Soloff PH et al (2005) High-lethality status in patients with borderline personality disorder. J Per Dis 19.4:386–399 (Print)
Stepp, SD, Paul AP (2008) Age-related differences in individual dsm criteria for borderline personality disorder. J Pers Dis 22.4:427 (Print)
Stone M et al (2009) Risk of suicidality in clinical trials of antidepressants in adults: analysis of proprietary data submitted to us food and drug administration. BMJ: British Medical J 339 (Print)
Szanto K et al (1997) Suicidal ideation in elderly bereaved: the role of complicated grief. Suicide Life-Threatening Behav 27.2:194–207 (Print)
Szanto K et al (2003) Occurrence and course of suicidality during short-term treatment of late-life depression. Archiv Gen Psychiatry 60.6:610–617 (Print)
Szanto K et al (2007) A suicide prevention program in a region with a very high suicide rate. Arch Gen Psychiatry 64.8:914–920 (Print)
Szanto K et al (2012) Social emotion recognition, social functioning, and attempted suicide in late-life depression. Am JGeriatric Psychiatry 20.3:257–265 (Print)
Szanto K et al (2013a) The cost of social punishment and high-lethality suicide attempts. Psychol Aging (in press) (Print)
Szanto K et al (2013b) Research to reduce the suicide rate among older adults: methodology roadblocks and promising paradigms. Psychiatric Serv 64.6:586–589 (Print)
Takahashi CHFY, Suh GH (2003) Elderly suicide prevention in east asia. Int J Geriatr Psychiatry 18.11:973–976 (Print)
Unutzer J et al (2002) Collaborative care management of late-life depression in the primary care setting: a randomized controlled trial (See Comment). JAMA 288.22:2836–2845 (Print)
Van Orden KA et al (2010) The interpersonal theory of suicide. Psychol Rev 117.2:575–600 (Print)

Vanderhorst RK, McLaren S (2010) Social relationships as predictors of depression and suicidal ideation in older adults. Aging Mental Health 9.6:517–525 (Print)
Waern M, Rubenowitz E, Wilhelmson K (2003) Predictors of suicide in the old elderly. Gerontology 49.5:328–334 (Print)
Waern M et al (2002a) Mental disorder in elderly suicides: a case-control study. Am J Psychiatry 159.3:450–455 (Print)
Waern M et al (2002b) Burden of illness and suicide in elderly people: case-control study. Bmj 324.7350:1355 (Print)
While D et al (2012) Implementation of mental health service recommendations in england and wales and suicide rates, 1997–2006: a cross-sectional and before-and-after observational study. Lancet 379.9820:1005–1012 (Print)
Wilson ST et al (2006) Impulsivity, suicidality and alcohol use disorders in adolescents and young adults with borderline personality disorder. Int J Adolesc Med Health 18.1:189–196 (Print)
Wilson ST et al (2007) Comparing impulsiveness, hostility, and depression in borderline personality disorder and bipolar ii disorder. J Clin Psychiatry 68.10:1533–1539 (Print)
World Health Organization (2005) Suicide prevention. Web