

## Delusional Misidentification and Aggression in Alzheimer's Disease\*

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**ABSTRACT:** Alzheimer's disease has been associated with serious behavioral disturbances including aggressive behaviors and agitation. Aggression in dementia of the Alzheimer's type may be associated with psychotic symptoms, particularly delusional misidentification phenomena. These phenomena are complex and varied in Alzheimer's disease and so far have been only rudimentarily described. In this paper, we explore the association of delusional misidentification and aggression in an individual suffering from Alzheimer's disease.

**KEYWORDS:** forensic science, Capgras syndrome, syndrome of intermetamorphosis, delusional misidentification, aggression, violence, dementia, Alzheimer's disease, psychosis

Beginning in the 1920s, Capgras and Reboul-Lachoux and others formally described various delusions of misidentification (1-3). The most commonly described and best known form of delusional misidentification is known as Capgras syndrome or syndrome of doubles. With Capgras syndrome the affected individual harbors a delusion of psychological misidentification with no change in the physical appearance of the misidentified objects (1,4-6). A common example would be the individual who believes his mother to have been replaced by an evil, but physically identical, impostor. Other forms of delusional misidentification toward others (e.g., syndromes of Frégoli and intermetamorphosis) have been described involving other combinations of physical and/or physical misidentification (5-7). Physical and/or psychological delusional misidentification in relation to the self has also been described (7-10).

Because delusional misidentification appears to occur more often in association with certain symptoms, such as depersonaliza-

tion, derealization, and paranoia (11-13), it may qualify as a syndrome. Nonetheless, whether delusional misidentification can be better characterized as a symptom (14) or syndrome (1,4) remains an unresolved issue pending more systematic investigation (15).

Delusional misidentification is generally found in individuals suffering from schizophrenia, schizoaffective disorder, or psychotic disorders due to general medical conditions (12,13). More recently, delusional misidentification and related phenomena have been frequently observed in those suffering from dementias of both the Alzheimer's and nonAlzheimer's types (16-18).

Delusional misidentification has been associated with verbal and physical aggression (19-24). Aggression is postulated to arise from viewing the misidentified persons as untrustworthy, evil, and/or threatening (20-22,24). Delusional misidentification involving the self has also been associated with aggression, although the psychological explanation usually involves grandiosity (21,22,25).

Dementia patients who experience aggressive delusional misidentification have also been studied by clinicians but their descriptions have usually lacked the sufficient phenomenological detail required to ascertain the chain of events culminating in aggression. This situation is not surprising given that many dementia patients are cognitively impaired to the extent that they cannot describe their subjective experiences in reasonable detail. In this article we describe the case of a man suffering from Alzheimer's disease who threatened to shoot his wife as he believed her to be an impostor. We attempt to explicate the genesis of his aggressiveness in part as a function of his psychiatric phenomenology. We also discuss the case from the standpoint of the current state of knowledge of the biology of delusional misidentification.

### Case History

Mr. D was a 71-year-old man who was admitted to a psychiatric hospital after threatening to shoot his wife. The gun was removed from his home shortly after the threat occurred. Mr. D had been experiencing progressive memory loss for the four years prior to the index admission. During the previous year, he had become increasingly paranoid and verbally aggressive toward his wife. Mr. D had threatened to kill her because he claimed that she was not his wife but a house cleaning woman posing as her. He added that the cleaning woman was involved in maliciously removing his real wife. Frequently, Mr. D visually recognized his wife as a woman that had been living with him for a long time but who was currently trying to pass as his wife. He sometimes perceived her as physically dissimilar to what he thought his wife's appearance should have been. At other times he recognized her as looking like his wife.

<sup>1</sup> Staff psychiatrist, Palo Alto Veterans Health Care System, Palo Alto, CA.

<sup>2</sup> Staff psychiatrist, Center for Forensic Services, Western State Hospital, Tacoma, WA, and clinical associate professor, Department of Psychiatry and Behavioral Sciences, University of Washington, Seattle, WA.

<sup>3</sup> Clinical professor of psychiatry, University of California, Los Angeles School of Medicine, and staff psychiatrist, Greater Los Angeles Veterans Health Care System, Los Angeles, CA.

<sup>4</sup> Resident in psychiatry, University of Texas Health Science Center at San Antonio, San Antonio, TX.

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Nonetheless, during these times he still believed that she was not his wife because of his belief that she did not behave like her. Mr. D was unable to recognize his wife's photographs taken during the preceding two years as those of his wife. Photographs of his wife taken approximately 5 to 30 years prior to the index admission were readily and accurately identified by Mr. D. Currently, the patient complained that his wife could not be his wife because she appeared "too old, not like the woman" in the photographs. Mr. D also usually did not identify his 37-year-old daughter who was living with Mr. D and his wife. Mr. D stated that the woman who posed as his daughter had the appearance of his daughter but behaved differently than his daughter. Mr. D had no difficulty identifying his other daughter, a 42-year-old who lived in another city and who had been more emotionally distant from him for many years. Mr. D had no significant difficulty visually recognizing other family members in person, or from past or recent photographs. He believed that the alleged impostor of his wife was dangerous because the impostor was trying to rob and kill him. He did not harbor hostility toward his misidentified daughter or any others.

The patient's history was negative for previous psychiatric involvement, head injury, seizure disorder, alcohol consumption, or drug abuse. There was no family history of mental disorder or dementia.

A mental status examination revealed that Mr. D was oriented to person but not to place or time. His short-term memory was severely impaired and his long-term memory, though better than his short-term memory, was also poor. His judgment and insight were poor. His associations were disorganized and illogical. His mood was mildly anxious and his affect was mildly labile. His kinetics were within normal limits.

Mr. D's complete blood count, serum chemistries, and urinalysis were unremarkable. His head CT scan showed generalized atrophy but no evidence of localized lesions. His electroencephalogram (EEG) revealed diffuse bilateral slow waves but no evidence of any focal process.

Mr. D was given a DSM-IV diagnosis of dementia of the Alzheimer's type. He was treated with the typical antipsychotic haloperidol at 10 mg per day with resulting diminution of his agitation, anxiety, and paranoid ideation. His misidentification delusions were reduced considerably by the end of his five-week hospitalization as he no longer misidentified his wife and daughter. However, he remained mistrustful of his wife. No homicidal or significant aggressive ideation was noted at the time of hospital discharge.

#### *Phenomenological, Nosological, and Biological Issues*

Mr. D presented with the intermittent delusion that he had been living with a woman who looked like his wife. He believed that this look-alike planned to steal his money and kill him. This presentation is consistent with Capgras syndrome because he believed in the existence of his wife's physical look-alike whose psychological makeup differed from that of his actual wife (1,4–6).

Even when Mr. D was in a Capgras state, he could consistently remember his wife's biography. He also consistently recognized his wife's current image from one visual exposure of her to another as the same person, though he did not acknowledge her to be his wife. Furthermore, he recognized the visual image of his wife as that of his wife even though he did not believe her to be his wife. Mr. D was essentially unable to link the correct visual experience of his wife to her correct biography. Believing that her

body harbored a different psychological identity than that of his wife, he concluded that she was an impostor. This chain of events is consistent with a psychological state in which a person is unable to link an accurate long-standing semantic web of associations preserved as the biography of his wife to a relatively intact ability to generate visual images that he recognized as corresponding to accurate visual representations of his wife. Speculation regarding the nature of this link has generated considerable discussion among neuroscientists who have proposed various explanations for the Capgras phenomenon. Hirstein and Ramachandran, for example, have proposed that Capgras syndrome is an expression of a broad memory management problem characterized by "a relatively intact or even exaggerated ability to individuate different episodic memories, but a deterioration in the ability to generate enduring categories . . . by extracting and linking a common denominator across successive episodes" (26). In the case of Mr. D we found that while in the Capgras state he was able to accurately construct his wife's biographical and superficial physical identities sequentially but was unable to connect them to each other. In other words, he failed in his attempt to link his long-term semantic biographical memories of his wife to his current visual memories of her. We interpret this to mean that although his long-term biographical semantic memories of his wife could be retrieved, he could not integrate them to accurately and consistently generate contemporaneous visual images of his wife in order to arrive at her actual personal identity. Mr. D's case raises the distinct possibility that the memory problem in Capgras states may be the inability to link normal biographical memories of the misidentified object with recent accurate visual memories of the misidentified object. Moreover, the disconnection between semantic and recent visual memories appears to be extremely selective as they apply only to assessments of the misidentified object.

Face processing deficits in Capgras states as suggested by research in this area (27,28) may explicate Mr. A's case while he was in a Capgras state. This is possible since a critical deficit in the Capgras state may involve visual processing abnormalities that may not always be consciously experienced by the affected individual. Investigators studying Alzheimer's disease have recently implicated an impairment of visual recognition that is correlated with cerebral blood flow impairment in the area of the temporal-parietal junction and the midtemporal and frontal cortex (29). Facial recognition deficits have also been reported in Alzheimer's patients and these may be based on both visual-spatial facial recognition deficits (30), lexical-semantic abnormalities (31), or perhaps both.

Possibly the greatest difficulty facing current neuropsychological explanations for the Capgras state is the fact that most Capgras cases involve relatively few consciously misidentified human objects out of the numerous people the affected person encounters. Therefore, psychological or neuropsychological explanations of Capgras states need to explain not only the deficits involving Capgras objects, but also provide the reason most human objects encountered by those with Capgras syndrome are not misidentified. An important aspect of delusional misidentification is the fact that misidentified human objects are usually affectively connected with the delusional individual. Therefore, the affective connection between the delusional individual and the misidentified object appears to play a key role in the misidentification process and could account for the general lack of misidentification of others by the delusional persons; and successful study of delusional may depend on the development of paradigms that consider the affective connection of Capgras objects to the affected individual as a phe-

nomenon intrinsic to Capgras syndrome. If an affective abnormality is intrinsically involved in the genesis of Capgras states, then the fact that most people encountered by Capgras individuals are not misidentified suggests that specific neuropsychological deficits, such as memory and visual abnormalities, may play a significant role in the genesis of Capgras and other delusional misidentification states—but only in synergy with an affect modulating mechanism. However, the nature of an affective abnormality in Capgras syndrome has not been systematically studied in depth, although it has been widely acknowledged (26,32,33). In fact, the associations between misidentification and affectivity has usually been deduced from the close relational emotional nature of the Capgras individual to the misidentified object. The manner in which affective and neuropsychologic factors are associated with depersonalization, derealization, anxiety, fear, hostility, and paranoia commonly observed in individuals suffering from Capgras and other delusional misidentification syndromes is currently little or poorly understood.

In the case of Mr. D, he also experienced episodes during which he did not consciously perceive his wife accurately, apparently encouraging him to conclude that she was not his wife. During such an episode he would experience his wife as a woman who was radically different than his true wife in both physical and psychological makeups. Moreover, he conceptualized her as an impostor who substituted herself for his true wife. The delusional belief in which both bodily and psychological makeups of others are thought to be radically changed is consistent with the syndrome of intermetamorphosis (3,5,6). Available phenomenological information also indicates that Mr. D could not visually recognize and identify her as his wife in recent photographs, suggesting an inability to incorporate into his recent memory new visual information with her biographical information during a delusional misidentification state of intermetamorphosis. Therefore, whatever type of new personal information he had about her did not coincide with objective information provided by his wife and others regarding her physical and psychological identities. Mr. D appeared to exhibit retrograde memory deficits ordinarily seen in Alzheimer's disease.

#### *The Association of Delusional Misidentification to Dementia*

For many years delusional misidentification due to dementia was not well-appreciated. Over two decades ago Goldfarb and Weiner called attention to the association between Capgras syndrome and dementia, stating that "Capgras syndrome occurs with frequency in association with those difficulties of memory and learning classified as organic brain syndrome (OBS) or dementia" (34). About a decade ago Kumar reported a case of dementia in which the affected person referred to the misidentified object as an impostor (35). Delusional misidentification has also been reported early during the development of dementia (36). Although several articles have mentioned cases of dementia of the Alzheimer's type and delusional misidentification, few phenomenological details of the delusional presentations have been described. More recently, delusional misidentification occurring in the context of dementia has become the object of increasing study as a high frequency of misidentification spectrum symptoms have been reported (37,38). However, even studies in this specific area have not focused on detailed phenomenological descriptions of delusional misidentification. Perhaps this should not be surprising given that demented persons are frequently too cognitively impaired to accurately report their subjective experiences.

#### *Aggression Among Individuals with Dementia*

The study of violence and dementia patients has recently attracted increasing interest, in part because the past solution of institutionalizing aggressive, demented individuals has become increasingly fiscally problematic (39). Several studies have found that individuals with dementia can act aggressively or violently. Haller and colleagues studied 52 inpatients over 60 years of age who were suffering from senile dementia and found that 9.6% attacked others during the first three days of hospitalization. In the same group, 23.1% had also attacked others during the two weeks prior to admission (40). In that study, the reasons dementia patients became violent included paranoid thinking, affective disinhibition, and availability of close human objects especially family members (40). In particular reference to Alzheimer's disease, Aarsland and colleagues studied 75 individuals with probable or possible Alzheimer's disease and found that physical aggression was associated with hallucinations and activity disturbance. They also found that delusional thinking was associated with verbal aggression (41). Chmerinski and colleagues studied 196 patients with probable Alzheimer's disease and found 5% presented with verbal aggression and 7% exhibited physical aggression during the four weeks preceding psychiatric evaluation. They also found that physical aggression was significantly associated with delusional thinking (42). Hwang and associates found that persecutory delusions in dementia patients placed them at increased risk for engaging in physical aggression (43). Delusional jealousy has also been associated with violence in dementia patients (44,45). All in all, the studies suggest that psychotic thinking plays a substantial if not significant role in the genesis of aggression in those suffering from dementia.

#### *The Relation of Aggression to Delusional Misidentification*

Delusional misidentification has been closely associated with aggression in several studies (19–23,46). Usually the misidentified objects are emotionally close to the affected individual. Relatives, friends, or other close acquaintances of the affected persons most often comprise the misidentified objects (13,21,47). Mr. D illustrated this point well because he misidentified his wife and one of his daughters. Misidentification delusions frequently contain a strong paranoid component. Individuals suffering from these delusions conceptualize the misidentified objects as malicious (21,22,47). In some cases of delusional misidentification, grandiosity associated with omnipotence appears to play a significant role in the genesis of aggressive behavior (22). Little is known about the nature of delusional misidentification in dementia and the extent of its association with aggression. Recently, Tsai and colleagues found that patients with probable Alzheimer's disease were more than twice as likely to display aggressive behaviors if delusional misidentification was present (48). In Mr. D's case, he became increasingly suspicious and hostile toward his wife in association with his inability to accurately identify her personal identity. His aggressive ideas were also associated with fear emanating from his paranoid delusional thinking. It is possible that the relevant affective component in the index case may be related to fear, hostility, and paranoia, but not delusional misidentification. However, phenomenologically it is also possible that these problems may be partially the result of cognitive and perceptual phenomena that may be the antecedents of delusional misidentification. Regardless of the specific causative factors in Mr. D's case, several psychiatric parameters could have played a role in his aggression.

## Treatment Issues

Given that the median frequency of agitation among individuals with dementia has recently been estimated at approximately 24% (49) and the frequency of physical aggression in a study of persons with dementia was found to be 14% (50), the problems of agitation, aggression, and psychosis appear to be commonplace. Therefore, there is significant need to develop treatment approaches to help reduce these problems. Treatment of the agitated and/or aggressive psychotic individual with dementia poses a challenge for psychiatry and other health care providers (50). High potency antipsychotic medication can be effective in the treatment of persons with dementia whose agitation and aggression are a result of psychotic symptoms (50,51). In particular, the use of the newer atypical antipsychotic agents appears to be generally preferable to using older typical (conventional) antipsychotic medications because of an equal or greater efficacy with a lower side effect profile (52–57).

Delusional misidentification syndromes, regardless of the associated diagnosed mental disorder, have been treated with both conventional and atypical antipsychotic medications and to a lesser extent with mood-stabilizing and antidepressant medications with varying efficacy (58). Mood-stabilizing medications such as valproic acid and carbamazepine appear to show some promise in limited trials in dementia patients (51,59,60). However, the efficacy of these medications in the treatment of aggression in the context of delusional misidentification remains to be explored. In Mr. D's case the use of antipsychotic medication alone substantially diminished his aggression and misidentification delusions.

## Future Directions

Because Alzheimer's disease and other dementias can lead to delusional misidentification, studies aimed at describing the fine structural phenomenology of delusional misidentification in dementia may improve our understanding of the mental life of dementia patients. The association of Alzheimer's disease and other dementias to biological substrates linked to aggression and delusional misidentification awaits further systematic study. The degree to which delusional misidentification may lead to physical aggression in the context of dementia also merits further detailed exploration, particularly in light of the frequent misidentification of family members and other persons who are either geographically and/or affectively proximate to the affected individual. Further study could generate improved biologic, behavioral, and environmental treatments, such as trials involving the newer atypical antipsychotics and mood-stabilizing medications, and applications of behavioral, supportive, and environmental interventions to optimize psychosocial outcomes.

## References

1. Capgras J, Reboul-Lachoux J. L'illusion des 'sosies' dans un délire systématisé chronique. *Bull Soc Clin Med Ment* 1923;11:6–16.
2. Courbon P, Fail G. Syndrome d'illusion de Frégoli et schizophrénie. *Bull Soc Clin Med Ment* 1927;15:121–5.
3. Courbon P, Tusques J. Illusion d'intermétamorphose et de charme. *Ann Med Psychol* 1932;90:401–6.
4. Todd J, Dewhurst K, Wallis G. The syndrome of Capgras. *Br J Psychiatry* 1981;139:319–27.
5. Silva JA, Leong GB, Shaner AL, Chang CY. Syndrome of intermetamorphosis: a new perspective. *Compr Psychiatry* 1989;30:209–13.
6. Silva JA, Leong GB, Shaner AL. A classification system for misidentification syndromes. *Psychopathology* 1990;23:27–32.
7. Signer SF. Capgras' syndrome: the delusion of substitution. *J Clin Psychiatry* 1987;48:147–50.

8. Vartzopoulos D, Vartzopoulos I. A variant of the syndrome of subjective doubles. *Am J Psychiatry* 1991;148:394–5.
9. Silva JA, Leong GB. A case of "subjective" Frégoli syndrome. *J Psychiatry Neuroscience* 1991;16:103–5.
10. Silva JA, Leong GB. Frégoli syndrome of the self. *Can J Psychiatry* 1993;38:68.
11. Christodoulou GN. Role of depersonalization-derealization phenomena in the delusional misidentification syndromes. In: Christodoulou GN, editor. *The Delusional Misidentification Syndromes*. Basel, Switzerland: Karger, 1986:99–104.
12. Berson RJ. Capgras syndrome. *Am J Psychiatry* 1983;140:969–78.
13. Kimura S. Review of 106 cases with syndrome of Capgras. In: Christodoulou GN, editor. *The Delusional Misidentification Syndromes*. Basel, Switzerland: Karger, 1986:121–30.
14. Signer SF, Benson DF. Two cases of Capgras symptom with dysmorphic (somatic) delusions. *Psychosomatics* 1987;38:327–8.
15. de Pauw KW. Delusional misidentification: a plea for an agreed terminology and classification. *Psychopathology* 1994;27:123–4.
16. Ballard CG, Bannister CL, Patel A, Graham C, Oyeboode F, Wilcock G, Chung MC. Classification of psychotic symptoms in dementia sufferers. *Acta Psychiatr Scand* 1995;92:63–8.
17. Ballard CG, Saad K, Patel A, Gahir M, Solis M, Coopie B, Wilcock G. The prevalence and phenomenology of psychotic symptoms in dementia sufferers. *Int J Geriatr Psychiatry* 1995;10:477–85.
18. Edelsyn NMJ, Oyeboode F. A review of the phenomenology and cognitive neuropsychological origins of the Capgras syndrome. *Int J Geriatr Psychiatry* 1999;14:48–59.
19. Fishbain DA. The frequency of Capgras delusions in a psychiatric emergency service. *Psychopathology* 1987;20:42–7.
20. de Pauw KW, Szulecka TK. Dangerous delusions: violence and the misidentification syndromes. *Br J Psychiatry* 1988;152:91–6.
21. Silva JA, Leong GB, Weinstock R. The dangerousness of persons with misidentification syndromes. *Bull Am Acad Psychiatry Law* 1992;20:77–86.
22. Silva JA, Leong GB, Weinstock R, Klein RL. Psychiatric factors associated with dangerous misidentification delusions. *Bull Am Acad Psychiatry Law* 1995;23:53–61.
23. Nestor PG, Haycock J, Doiron S, Kelly J, Kelly D. Lethal violence and psychosis: a clinical profile. *Bull Am Acad Psychiatry Law* 1995;23:331–52.
24. Silva JA, Leong GB, Weinstock R. Misidentification syndromes, aggression and forensic issues. In: Schlesinger LB, editor. *Explorations in Criminal Psychopathology: Clinical Syndromes with Forensic Applications*. Springfield, Illinois: Charles C Thomas, 1996:33–49.
25. Silva JA, Leong GB, Weinstock R, Penny G. Dangerous delusions of misidentification of the self. *J Forensic Sci* 1995;40:445–8.
26. Hirstein W, Ramachandran VS. Capgras syndrome: a novel probe for understanding the neural representation of the identity and familiarity of persons. *Proc Royal Soc London B* 1997;264:437–44.
27. Young AW, Ellis HD, Szulecka TK, de Pauw KW. Face processing impairments and delusional misidentification. *Behav Neurology* 1990;3:153–68.
28. Ellis HD, de Pauw KW, Christodoulou GN, Papageorgiou L, Milne AB, Joseph AB. Responses to facial and non-facial stimuli presented tachistoscopically in either or both fields by patients with Capgras delusion and paranoid schizophrenia. *J Neurol Neurosurg Psychiatry* 1993;56:215–9.
29. Kessler J, Herholz K, Grand M, Heiss WD. Impaired metabolic activation in Alzheimer's disease: a PET study during continuous visual recognition. *Neuropsychologia* 1991;29:229–43.
30. Della Sala S, Muggia S, Spinnler H, Zuffi M. Cognitive modelling of face processing: evidence from Alzheimer patients. *Neuropsychologia* 1995;33:675–87.
31. Becker JT, Lopez OL, Boller F. Understanding impaired analysis of faces by patients with probable Alzheimer's disease. *Cortex* 1995;31:129–37.
32. Wallis G. Nature of the misidentified in Capgras syndrome. In: Christodoulou GN, editor. *The Delusional Misidentification Syndromes*. Basel, Switzerland: Karger, 1986:40–8.
33. Ellis HD, Young AW. Accounting for delusional misidentifications. *Br J Psychiatry* 1990;157:234–48.
34. Goldfarb AI, Weiner MB. The Capgras syndrome as an adaptational maneuver in old age. *Am J Psychiatry* 1977;134:1434–6.
35. Kumar V. Capgras syndrome in a patient with dementia. *Br J Psychiatry* 1987;150:251.

36. Lipkin B. Capgras syndrome heralding the development of dementia. *Br J Psychiatry* 1988;153:117-8.
37. Burns A. Psychosis in dementia of the Alzheimer type. In: Katona C, Levy R, editors. *Delusions and Hallucinations in Old Age*. London: The Royal College of Psychiatrists 1992:228-42.
38. Forstl H, Besthorn C, Burns A, Geiger-Kabisch C, Levy R, Sattel A. Delusional misidentification in Alzheimer's disease: a summary of clinical and biological aspects. *Psychopathology* 1994;27:194-9.
39. Yorston G. Aged and dangerous, old age forensic psychiatry. *Br J Psychiatry* 1999;174:243-5.
40. Haller E, Binder RL, McNiel DE. Violence in geriatric patients with dementia. *Bull Am Acad Psychiatry Law* 1989;17:183-8.
41. Aarsland D, Cummings JL, Yenner G, Miller B. Relationship of aggressive behavior to other neuropsychiatric symptoms in patients with Alzheimer's disease. *Am J Psychiatry* 1996;153:243-7.
42. Chemerinski E, Petracca G, Teson A, Sabe L, Leiguarda R, Starkstein SE. Prevalence and correlates of aggressive behavior in Alzheimer's disease. *J Neuropsychiatry Clin Neurosci* 1998;10:421-5.
43. Hwang J, Tsai S, Yang C, Liu K, Lirng J. Persecutory delusions in dementia. *J Clin Psychiatry* 1999;60:550-3.
44. Silva JA, Ferrari MM, Leong GB, Penny G. The dangerousness of persons with delusional jealousy. *J Am Acad Psychiatry Law* 1998;26:607-23.
45. Sibisi CDT. The phenomenology of delusional jealousy in late life. *Int J Geriatric Psychiatry* 1999;14:398-403.
46. Silva JA, Leong GB, Garza-Trevino ES, LeGrand J, Olivia D Jr, Weinstock R, Bowden CL. A cognitive model of dangerous delusional misidentification syndromes. *J Forensic Sci* 1994;39:1455-67.
47. Silva JA, Leong GB, Weinstock R, Boyer CL. Capgras syndrome and dangerousness. *Bull Am Acad Psychiatry Law* 1989;17:5-14.
48. Tsai S, Hwang J, Yang C, Liu K. Physical aggression and associated factors in probable Alzheimer disease. *Alzheimer Disease and Associated Disorders* 1996;10:82-5.
49. Cohen-Mansfield J, Billig N. Agitated behavior in the elderly. I. A conceptual review. *J Am Geriatric Soc* 1986;34:711-21.
50. Small GW, Tariot PN. Improving the management of dementia. *Psychiatric Times* 1999;16(3):34-9.
51. Raskind MA. Evaluation and management of aggressive behavior in the elderly demented patient. *J Clin Psychiatry* 1999;60 (Suppl 15):45-9.
52. Workman RH, Orengo CA, Bakey AA, Molinari VA, Kunik ME. The use of risperidone for psychosis and agitation in demented patients with Parkinson's disease. *J Neuropsychiatry Clin Neurosciences* 1997;9:594-7.
53. Herrmann N, Rivard M, Flynn M, Ward C, Rabheru K, Campbell B. Risperidone for the treatment of behavioral disturbances in dementia: a case series. *J Neuropsychiatry Clin Neurosci* 1998;10:220-3.
54. Laveretsky H, Sultzer D. A structured trial of risperidone for the treatment of agitation in dementia. *Am J Geriatr Psychiatry* 1998;6:127-35.
55. Katz IR, Jeste DV, Mintzer JE, Clyde C, Napolitano J, Brecher M. Comparison of risperidone and placebo for psychosis and behavioral disturbances associated with dementia: a randomized, double-blind trial. *J Clin Psychiatry* 1999;60:107-15.
56. Maxiner SM, Mellow AM, Tandon R. The efficacy, safety, and tolerability of antipsychotics in the elderly. *J Clin Psychiatry* 1999;60 (Suppl 8):29-41.
57. Tariot PN. Treatment of agitation in dementia. *J Clin Psychiatry* 1999;60 (Suppl 8):11-20.
58. Silva JA, Leong GB, Miller AL. Delusional misidentification syndromes: drug treatment options. *CNS Drugs* 1996;5:89-102.
59. Kunik ME, Puryear L, Orengo CA, Molinari V, Workman RH Jr. The efficacy and tolerability of divalproex sodium in elderly demented patients with behavioral disturbances. *Int J Geriatr Psychiatry* 1998;13:29-34.
60. Hermann N. Valproic acid treatment of agitation in dementia. *Can J Psychiatry* 1998;43:69-72.

Additional information and reprint requests:  
 J. Arturo Silva, M.D.  
 P.O. Box 20928 San Jose, CA 95160