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# A CONCEPTUAL ANALYSIS OF SUNDOWNING SYNDROME

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A CONCEPTUAL ANALYSIS OF SUNDOWNING SYNDROME

by

Hank Webb

B.S., Portland State University, 2008

A Research Paper  
Submitted in Partial Fulfillment of the Requirements for the  
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A CONCEPTUAL ANALYSIS OF SUNDOWNING SYNDROME

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Approved by:

Dr. Jonathan C. Baker, Chair

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TITLE: A CONCEPTUAL ANALYSIS OF SUNDOWNING SYNDROME

MAJOR PROFESSOR: Dr. Jonathan C. Baker

Those diagnosed with dementia and Alzheimer's disease present with varying degrees of behavioral symptomatology as the state of cognitive impairment progresses. The most marked of these symptoms are agitation and confusion, which can occur at any time of the day. When some individuals display these symptoms late in the afternoon they are said to be "sundowning." Sundowning is a term that has been applied to the phenomena of various behaviors occurring during this time of day but it has never been considered an official diagnosis nor has it ever been formally defined. This paper examines the concept of sundowning and its function in the field of Behavior Analysis and, furthermore, its advancement of the science of elder care.

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## CHAPTER 1

### INTRODUCTION

It is estimate that 2.4-66% of older adults experience what is commonly known as *sundowning syndrome* (Bachman & Rabins, 2006; Khachiyants, Trinkle, Son, & Kim, 2011; Kim, Louis, Muralee, & Tampi, 2005; Sharer, 2008). *Sundowning*, in the context that it is applied, refers to behaviors presented as agitated, anxious, confused, and/or delirious in appearance by elderly individuals associated with the later portion of the day (Bachman & Rabins, 2006; Khachiyants et al., 2011). However, the term sundowning is a misnomer as it is implied and can lead health care providers astray from effective responding, if it prompts responding at all.

The problem behaviors of older individuals often leads to stress for their caregivers and in turn these individuals are being placed in a long-term care setting (Jeste et al., 2008), which often results in a medicinal intervention (Gill et al., 2007). Most often when problem behaviors are observed by caregivers, there is a pharmaceutical intervention implemented where medications such as thioridazine, chlorpromazine, haloperidol, trifluoperazine, or risperidone (Ballard et al., 2009) are administered. Of these medicinal options, 70% are for used for off-label purposes (Guenette, Chintoh, Remington, & Hahn, 2014) in an effort to calm the individual and suppress problem behaviors. While the practice of pharmaceutical management of behaviors alleviates the burden on staff and caregivers, it only serves to mask the real problem of what maintains these responses in the environment. The aging population is being unnecessarily prescribed antipsychotic medications for such behaviors as

dementia, delirium, and agitation to name a few, but these medications may not be for this intended use (Wang et al., 2005)

Saltz, Robinson, and Woerner (2004) found that antipsychotic medications are being used 50% to 75% of the time to treat a population of older individuals where 40% to 95% present with these behaviors. A significant point made in this review is that few of these individuals have been provided mental health services (Saltz, Robinson, & Woerner, 2004). Furthermore, as Saltz et al. discuss, elderly individuals will choose to see doctors who do not have enough training in the administration of these medications. Yury and Fisher (2006) point out that there is a 60-80% possibility that older individuals will present with problem behaviors with a lifetime risk of 90%. This highlights a concern of just how these behaviors will be managed.

Most alarming are the findings by Ballard et al. (2009) who found a significant rate of mortality among individuals with Alzheimer's disease (AD). According to Ballard, there are an estimated 25 million people with AD, and 30-60% these individuals will be prescribed an antipsychotic as a first choice in pharmacological treatment intervention, typically for a long period of time. Ballard et al. were interested in the use of antipsychotics over the long term as compared to previous studies that evaluated more short-term results. The focus of their review was to compare mortality rates of an aging population of those who took antipsychotics as compared to those who took a placebo. This study showed a 70% survival rate for the treatment group as compared to 77% for the placebo group over a one-year period. By the time the extended follow-up had reached 42 months, the survival rate for the treatment group and the placebo group was shown to be 26% and 53% respectively (Ballard et al., 2009). Wang et al. (2005) found

similar results, with a 60% increased mortality rate of the elderly population who took antipsychotics when compared to the same population who did not have this class of medication prescribed to them. Additionally, Jeste et al. (2008) report 1.6 to 1.7 times a greater chance of death with the use of antipsychotic medication in an elder population than those not prescribed an antipsychotic.

The purpose of this disquisition is to highlight the misappropriation of the term sundowning in an attempt to bring awareness to the unnecessary interventions (i.e., the use of medications to manage these behaviors) that are relied upon to address maladaptive behavior. Medicating the elderly for this reason is prevalent in these situations but may not be necessary. Gill et al. (2007) showed through random control trials that the side effects of such medications outweighed their benefits and that these medications are less than adequate for managing psychiatric symptoms of dementia (Yury & Fisher, 2006). This does not begin to address the secondary problem of using antipsychotic medication for its sedative properties in order to promote calm in the individuals. That is a topic for another day. However, the topic for today is behavior and the misleading cause being attributed to it. Unfortunately, once the term sundowning is applied, further consideration ends. As long as sundowning is offered-up as an explanation for the cause of problem behavior in the elder population, there is no reason to seek efficacious treatment. The following section will review the literature on sundowning to illustrate the downfalls of the term, as well as its impact on impeding treatment.

## CHAPTER 2

### CONCEPT OF "SUNDOWNING"

Following the studies of the heliotrope plant and its folding leaves in the 1700s, most cellular structures have presented with a natural ability to generate internal rhythms (Bliwise, 1994). Mammals exhibit this ability through various and complex physiological systems such as body temperature, blood pressure, and sleep/wakefulness to name a few (Bliwise, 1994).

In 1941, psychiatrist Donald Ewen Cameron observed in an early study that lower levels of light in the evening was thought to cause the change in behavior of some individuals (Evans, 1987). He “described this phenomenon...as ‘nocturnal delirium’ and ‘delirium and agitation within one hour of darkness’” (Khachiyants et al., 2011, p. 276).

Healthcare professionals have observed that some individuals with dementia show increased agitation and confusion associated with late afternoon or night (Bliwise, 1994) and have referred to this as sundowning or sundown syndrome (Khachiyants et al., 2011; Rindlisbacher & Hopkins, 1991). These terms have been applied to phenomenon of disruptive behavior that includes a) delirium and agitation that occur within one hour of darkness, or b) the exacerbation of disruptive behaviors that is associated with afternoon and/or evening hours that tend to abate within one hour sunrise (Bachman & Rabins, 2006; Sharer, 2008). Kim, Louis, Muralee, and Tampi (2005) state that associated behaviors include “... confusion, anxiety, agitation, or aggressiveness with increased motor activity like pacing, wandering, resistance to redirection, and increased verbal activity such as yelling” (p.32). Rindlisbacher and Hopkins (1991), in their review of written works, were unable to find any one individual

who developed the term and found its earliest use dating back to 1973. Sundowning is a descriptive term and is not a recognized as an official psychiatric diagnosis and while observations on sundowning are found in many professional journals, they have failed to agree on its conceptual existence (Khachiyants et al., 2011). Rindlisbacher and Hopkins (1991) note in their review of various literature on the subject that the term sundowning is most commonly used as a note in facility manuals but rarely written up in scholarly articles. Furthermore, Bachman and Rabins (2006) add that “despite the general inclusion of sundowning in neurologic, psychiatric, and nursing textbooks as a legitimate clinical condition, the research literature is divided on the existence and/or prevalence of this syndrome” (p. 500). As a result of the lack of a conclusive description, researchers are still uncertain as to the exact prevalence of sundowning, though some suggest that it ranges from 2.4% to 66%, with about 13% of those individuals living in nursing homes (Bachman & Rabins, 2006; Khachiyants et al., 2011; Kim et al., 2005; Sharer, 2008).

Though conceptually lacking, the term sundowning has been regularly used to characterize disruptive behaviors in the elderly (Khachiyants et al., 2011) presenting from late day into the evening. While some research includes patients who are deemed cognitively sound, a majority of the research reserves this term for those diagnosed with a neurological malady (Bachman & Rabins, 2006). While these behaviors are associated with disorders such as dementia, delirium, sundowning is differentiated (Kim et al., 2005) by the change in the symptoms as they intensify in the twilight hours. In some researcher, according to Bachman and Rabins (2006), the occurrence of sundowning includes the entire night, increasing its prevalence in all sleep disorders

that are considered disruptive. The American Sleep Disorders Association regards sundowning to incorporate "the sleep disturbance that is characterized by nocturnal wandering and confusion" (Bachman & Rabins, 2006, p. 499). Rindlisbacher and Hopkins (1992) conclude that the differences between those individuals who are thought to have with sundowners and those without are inconclusively determined.

While sundowning is a commonly used term in the medical field, the term is applied to a wide range of periods in the day. Researchers are hesitant to provide an exact time frame for when sundowning would occur, but have suggested that sundowning can occur any time from the later afternoon into the night (e.g., Bachman & Rabins, 2006; Bliwise, 1994; Drake, Drake, & Curwen, 1997; Evans, 1987; Khachiyants et al., 2011; Rindlisbacher & Hopkins, 1991; Volicer, Harper, Manning, Goldstein, & Satlin, 2001). Although some researchers have found specific windows of time in which disruptive behaviors occur. Symptoms have been reported to worsen about an hour before darkness and continue until approximately an hour before light (Sharer, 2008). Bliwise (1994) notes that researchers have found that different behaviors have been recorded at different times of the day. For instance, recording aggressiveness occurring in the evening, from 4:30 p.m. to 11:00 p.m., vocalizations occurring from 11 p.m. to 6 a.m., and wandering occurring in the evening hours from 7:00 p.m. to 10:00 p.m. (Bliwise, 1994). In Cohen-Mansfield et al.'s pivotal 1989 study, they found that many elderly patients display agitated behaviors at varying times of the day, even in the early mornings, while Bachman and Rabins (2006) note that previous research has found significant agitation levels in the middle of the day. The uncertainty of sundowning syndrome and its existence is supported by the conflicting literature currently available.

Some research does not play a supportive role in the concept of sundowning citing that behaviors can happen at any time of day (Bachman & Rabins, 2006; Volicer et al., 2001) but are just noted more in the evening because they simply increase as the day ends or burdened staff are more likely to notice (Khachiyants et al., 2011). Additionally, research suggests these behaviors are associated with some individuals or the time of day, but there are no conclusive findings (Cohen-Mansfield et al., 1989; Kim et al., 2005; Rindlisbacher & Hopkins, 1991). Conversely, there are studies have shown that some behaviors are consistent with diurnal patterns (Bachman & Rabin, 2006; Cohen-Mansfield et al., 1989; Evans, 1987; Khachiyants et al., 2011; Volicer et al., 2001).

Despite the varying theories of when sundowning actually occurs, there are even more theories related to the etiology of sundowning. Research has determined that the possible causes of sundowning can consist of physiological, environmental, and psychological factors (Khachiyants et al., 2011; Kim et al., 2005). In the following section, I will briefly describe some of the more commonly discussed theories about the etiology of sundowning. This will include (a) circadian rhythm disorders, (b) sleep issues, (c) medical, (d) psychological maladies, and (e) maladaptive reactions to environment (Bachman & Rabins, 2006; Bliwise, 1994; Evans, 1987; Khachiyants et al., 2011; Kim et al., 2005; Rindlisbacher & Hopkins, 1991; Sharer, 2008).

Many of the research articles on etiology focus on circadian rhythm as one of the main contributing factors of causation in sundowning (Bachman & Rabins, 2006). According to Vitaterna, Takahashi, and Turek (2001), the circadian rhythm is a person's: ...biological "clock," [which] allows the organism to anticipate and prepare for the changes in the physical environment that are associated with day and night,

thereby ensuring that the organism will “do the right thing” at the right time of the day. (p. 85)

At the center of the body's clock is the suprachiasmatic nucleus (SCN), which controls our biological cycles (Swaab, Fliers, & Partiman, 1985). As individual ages, researchers believe that degeneration of the SCN occurs from the accumulation of plaque, potentially resulting in a disordered circadian rhythm (Sharer, 2008). Disruption in the circadian rhythm (Bliwise, 1994) is believed to affect body temperature, REM sleep, and internal sleep/wake signals to name a few (Bachman & Rabins, 2006; Bliwise, Yesavage, & Tinklenberg, 1992; Khachiyants et al., 2011; Sharer, 2008), symptoms that all affect sleep.

Complications with quality sleep can be associated with both internal and external sources. Internal sources would be biologically based changes that occur with age, whereas external sources could be biological but are brought on by environmental changes (e.g., the administration of medication, although resulting in internal biological changes, are the result of factors external to the individual). Internal sleep problems may be the result of effects on the SCN, Restless Leg Syndrome, incontinence, pain, depression, and sleep apnea (Bachman & Rabins, 2006; Bliwise, 1994; Kim et al., 2005). Conversely, external environmentally related causes of sleep disturbances include, but are not limited to, being awoken by staff, low levels of sunlight, noise, medication effects, excessive lighting at night, activity levels during the day (Bachman & Rabins, 2006; Kim et al., 2005), room temperature, and social demands (Grandin, Alloy, & Abramson, 2006). These factors can extend beyond diminishing the quality of sleep for an individual.

Medical conditions can also affect a person's disposition and contribute to disruptive behavior. Mood can also change as levels in physical pain vary from such issues as a) toileting needs, b) hip fractures, c) respiratory infections, and d) arthritis to name a few (Bachman & Rabins, 2006; Khachiyants et al., 2011; Rindlisbacher & Hopkins, 1991). An individual's co-morbidities including dehydration, diabetes (fluctuating glucose levels), and changes in blood pressure are other medical issues that are thought to alter mood during the day (Evans, 1987; Khachiyants et al., 2011). Macular degeneration, ocular degeneration, and cataracts are a few of the optical problems that can limit the amount of natural light seen, contributing to environmental deprivation (Khachiyants et al., 2011). The impairment of the senses (Bachman & Rabins, 2006) would only decrease environmental cues.

Environmental variants can deplete an individual of the energy needed to cope with daily life. Events such as a) moving to a nursing facility, b) changing rooms, c) the chaos of shift changes, d) overstimulation in the environment, e) high activities levels, and f) staff/patient conflicts can all cause distress and fatigue by the end of the day (Bachman & Rabins, 2006; Evans, 1987; Khachiyants et al., 2011; Kim et al., 2005; Rindlisbacher & Hopkins, 1991). Additionally, other research has shown that social isolation, low activity, and unmet social/physical needs (Bachman & Rabins, 2006), low staffing, boredom, and noise can contribute to sundowning as well (Evans, 1987; Khachiyants et al., 2011; Sharer, 2008). Similarly, medications have shown to affect mood as they take effect, wear off, or from side effects (Bachman & Rabins, 2006; Kim et al., 2005; Sharer, 2008).

It is important to consider the possible psychological issues of sundowning that are outlined in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; DSM-IV-TR; American Psychiatric Association, 2000). The disruptive behaviors of sundowning have also been commonly referred to as delirium, nocturnal delirium, or have been associated with delirium (Bachman & Rabins, 2006; Bliwise, 1994; Cameron, 1941) even though it is recognized by its own unsubstantiated definition (Khachiyants et al., 2011; Kim et al., 2005; Rindlisbacher & Hopkins, 1991). The American Psychiatric Association (2000) states, "The essential feature of delirium is a disturbance of consciousness that is accompanied by a change in cognition that cannot be better accounted for by a preexisting or evolving dementia" (p.136). Between the speed of onset and variation of symptoms, an individual can appear stable at morning shift but present irrationally by day's end (American Psychiatric Association, 2000). It is important however, to separate a diagnosis of delirium from other disorders such as dementia, mood, or psychotic, which can exhibit similar characteristics of delirium but are different (American Psychiatric Association, 2000). Additionally, depressive episodes can create fluctuations in mood and can affect concentration, sleep, and agitation levels (Bachman & Rabins, 2006) within individuals (American Psychiatric Association, 2000; Grandin et al., 2006; Khachiyants et al., 2011). Bachman and Rabins (2006) add that "...individuals with dementia might become upset by visitors who appear strange to them or by visitors who are seeing other residents of the facility" (p. 503-504), referencing the psychological effects of dementia that add to the complexities of the sundowning terminology and its use. While some studies or reviews state the presence of dementia or Alzheimer's disease (Bachman & Rabins, 2006; Bliwise, 1994;

Khachiyants et al., 2011), there does not appear to be a formal diagnosis of depression or any other psychiatric disorders in the examples used (Cameron, 1941; Kim et al., 2005; Rindlisbacher & Hopkins, 1991).

## CHAPTER 3

### WHAT IS A TERM?

Terminology and its use in science may provide a coherent description of a concept, but it still leaves disagreement (Slisko & Dykstra, 1997). According to Ketner (1981), this can be traced back to the 17th century and the field of chemistry during a time when the printed scientific word was at the will of the author that printed it. Alchemists of the time practiced what was called the *Charismatic method* (Ketner, 1981), which served as a way to self-promote and to safe guard their processes but did not establish truth in the field of science. American philosopher Charles S. Peirce recognized this problem (Ketner, 1981), making it a focus in his writings and practice as a scientist and mathematician, as well as French chemist Antoine Lavoisier who felt language was a tool used for knowledge. Hogben (as cited in Ketner, 1981, p. 333) quotes Lavoisier when he said "The word should give birth to the idea; the idea should depict the fact."

Much that is written about terminology continues to come from the hard sciences. Physicists Slisko and Dykstra (1997) feel that the fallacies of some scientific thought do not support proper education because uniformity does not exist. Slisko and Dykstra state, "Generally in physics we intend to define a physical quantity by its operational definition, which leads to a specific dimension (and unit) and not vice versa" (p. 657). In a scientific account of phenomena, terms must have objective standards and those standards must be maintained to allow effective communication (Raad, 1989). Winter and Knudson (2011) provide an example of this problem in the field of sports medicine. They note that often there is no distinction between *mass* and *weight* when referring to

body size in the field, but then point out that *mass* is the amount of matter in a body and *weight* is the force exerted by that body that arises from gravitational attraction, so to use the terms interchangeably is to show a lack of understanding of the both the origins of the words, as well as how the use of the words could impact future replication. The influx of scientific progress has come to use existing language (Raad, 1989) to develop new terms in various forms as well as a change in opinion of proper use of terms.

Examples of this can be seen in the current news media. Recently, the Polar Vortex has been blamed for arctic blasts of cold air (where as a Polar Vortex is arctic air amassed at the poles that occasionally makes its way south when low air pressures allows, which is normal winter weather (Eloy, 2014)). This can also be seen when drug manufacturers are labeled *cartels* (Sanguinetti & Reyes, 2012). While the term cartel implies that the drug trade is larger and more sophisticated than it really is, the term *network* is better suited because of the numerous parties involved, the market area they cover, and the lack of organizational structure, (Sanguinetti & Reyes, 2012).

Although many examples of the issue of incorrect term use can be found in the hard sciences, researchers have also noted this issue in burgeoning areas, like psychology. Indeed, in a series of papers, Skinner discussed the issues that exist with terms and their use, both in the scientific community and more colloquial situations. When referring to the use of psychological terms, B. F. Skinner (1984) wrote, "The language of private events is anchored in the public practices of the verbal community..." (p. 547). The point that Skinner was conveying in this paper was that definitions, while providing us with a frame of reference, do not sufficiently establish a relationship between the term and the behaviors even when a person's verbal

community supports the term. In fact, Skinner wrote that using *term* is more appropriate than labeling something as a *concept* and that function determines what it actually is. He believed that knowing the situation in which a term would apply and the factors of those situations that would control that behavior are important. Simply put, the use of a term in a given situation depends on when and how it is used and the acceptance by those around us when the term is used in a specific context.

The problem discussed by Skinner (1984) is that there is absolutely no way to know what internal factors are contributing to an individual's behavior, because others cannot detect them like the individual can for environmental influences such as high temperatures or traffic lights. He goes on to say that factors that influence behavior do not have to be visible to others to truly exist (Skinner, 1984). According to Skinner, it is possible to acknowledge the occurrence of these internal causes in others by acknowledging the observable, outward behavior such as someone limping or holding their stomach. It is also possible that an individual may react to internal causes in such a way that does not relate to previous responses and thus the verbal community may attribute the behavior to the wrong cause (Skinner, 1984). How a verbal community effectively addresses these internal events, as Skinner says, exists in how "...terms are assigned to private events..." although faults can still lie in this process as these "private events" cannot be analyzed (p. 549).

Another issue with the use of psychological terms discussed by Skinner (1984) is that the use of a term may be supported by more than one context in which it is used, for example, saying, "I'm hungry" may mean different things to different people. Furthermore, Skinner also states that the level of intensity of internal influences also

play against external acknowledgement by others in relation to the future presentation of the behavior. In other words, the behavior elicited by a toothache may override a coworker's history of sympathy if the pain is severe enough. The point that Skinner makes is that behavior can simply be evoked and maintained by what others say. He stated, "...it is only because the behavior of the individual is important to society that society in turn makes it important to the individual" (p. 551), meaning, it is those around us that make us aware of us. In summation, Skinner states that we must consider the impact terms have on our environment and the influence they have on the behaviors of others. In extracting Skinner's account of psychological terms to an aging setting and specifically sundowning, it is possible to hypothesize about the impact that such a term might have on the behavior of staff and scientists. Although the following account is hypothetical, it is based on our current understanding of human behavior and could be classified as an "exercise in interpretation" (Skinner, 1957, p. 11).

It is given that staff in geriatric living facilities will experience an individual who begins to present with maladaptive behaviors at any given time of day (Baker, Hanley, & Mathews, 2006). Although these behaviors are not understood in their true nature, staff are quick to apply a causation to satisfy explanation and use the term (i.e., sundowning) freely, unaware that the behaviors being displayed have nothing to do with the setting sun. The term goes without question because it usually originates from a supervisor or lead worker who has heard the term used in a staff meeting or has read about it in a published journal. The term then gets passed around very easily and in short order becomes the diagnosis for anyone who appears confused or agitated starting in the late afternoon. The term allows staff to discuss a cause for a behavior that was previously

unexplainable. However, due to the belief that calling the behaviors sundowning in fact explains the phenomena (instead of just describing it), people often think that further analysis is unnecessary. Given that the behavior of older adults is impacted by their environment (Baker et al., 2006), if challenging behavior is explained as sundowning and no further analysis is needed, staff will never focus on the impact of their own behavior and unfortunately, the challenging behavior will continue to occur. Problems like this extend beyond the aging work place and more than likely originated when the term started showing up in published manuscripts. As it has been discussed earlier in this manuscript, there is a substantial supply of literature that refers to a phenomenon that has yet to be properly addressed. Even the origin of the term itself is elusive and, for this, strikes at the very foundation of its legitimacy. These articles discuss the term sundowning and whether it exists, but do not show that there is a function between the sun and the problem behavior noted.

It is easy to make assumptions about an individual's appearance or behavior. The term sundowning really does sound like a clinically relevant term to apply to individuals that appear to be having a rough time at the end of the day. But when it comes to true understanding of a person's behavior, the power of the sun is not as important as the actual function of the behavior itself. In the next section the term sundown will be functionally examined.

## CHAPTER 4

### METHODOLOGICAL TWILIGHT OF “SUNDOWNING”

To be fair, the literature used in this conceptual presentation does contain some acknowledgement of the use of certain assessment tools or the need for proper examination of the term sundowning in an effort to provide an adequate understanding of the phenomenon. For example, the Confusion Inventory (Evans, 1987) the Cohen-Mansfield Agitation Inventory (CMAI), and the Agitated Behavior Mapping Instrument (ABMI) (Cohen-Mansfield 1989) have been used to assess maladaptive behavior in individuals in studies that examined sundowning. Adding a methodological approach to assessment, Bliwise (1994) suggested that a prediction of behaviors at certain times of the day may provide more clarity into the value of the term.

There is an old Latin saying that goes “*Post hoc, ergo propter hoc*” meaning “after this, therefore, because of this.” Science has pushed to advance beyond this archaic, and logically flawed (“Post hoc fallacy,” 2009), way of thinking. A methodological approach is fundamental if an understanding of this phenomenon is to be achieved. Alan Kazdin (2011) provides a point of origination with the statement “The unique feature of experimentation is that it examines the direct influence of one variable (the independent variable) on another (the dependent variable)” (p.25). The idea that Kazdin conveys is that an experiment should be designed to rule out all but the most possible causes, but more specifically, the operational design of the study has to show the true relationship between the two variables rather than the effects of an outside influence. It is also stressed by Kazdin that the reliability and validity of the measurements are important criteria to keep in mind while constructing a study.

Measurements not only have to be continuously used according to procedure to be reliable, but they also have to be relevant to what is being evaluated to be valid. Furthermore, Kazdin adds that operational definitions are necessary to start the evaluation process if there is going to be understanding of what is being examined which include a) objectivity, b) clarity, and c) completeness. Supporting this scientific philosophy, Johnston and Pennypacker (2009) state that being able to define a behavior guides the study and understanding of that behavior as it is being evaluated.

Johnston and Pennypacker (2009) have said, "It is impossible for a behavior to occur that does not influence the environment in some way" (p. 27). Consider the implications this statement makes when referring to the earlier example of the term sundowning being used in a workplace when there is no scientific foundation for the term and the aforementioned guidelines for operational definitions. The process of studying a behavior can guide the experimenter to consider important procedures (Johnston & Penneypacker, 2009), procedures like the processes that Kazdin (2011) proposed earlier.

The argument by Kazdin (2011) and Johnston and Pennypacker (2009) provides a context to illustrate how analyzing an individual's responses, particularly an older adult's responses in an aging facility, to the environment behaviorally will result in an opportunity to accurately manage their behavior. For example, a resident is observed by staff becoming agitated and confused between 5:00 and 6:00 on most evenings. Now if this was truly the result of sundowning, it would be easy to install a new lighting system and the problem would be solved, if the levels of sunlight were the cause of such behaviors. However, if a functional analysis was performed, the true nature of the

observed behaviors would be revealed. Once the sustaining cause of the behavior is discovered, whether it be from the effects of medication, poor sleep, an overwhelming activity schedule, access to food, access to attention, or a way to escape an aversive situation to name a few, caregivers can then make the necessary adjustments to provide the individuals in their care a better quality of life. When analysis turns away from what is relevant, the actual behavior, analysis will fail to provide effective treatment. Published literature (Baker et al., 2006; Baker, LeBlanc, Raetz, & Hilton, 2011; Buchanan & Fisher, 2002; Dwyer-Moore & Dixon, 2007) has shown that this approach leads to efficacious treatments.

The key focus of topic is behavior. The use of the term sundowning has always been evoked by the behavior of individuals (as observed by caregivers). Classifying the dependent variable of interest here, which is behavior, as anything other than behavior (e.g., sundowning), impedes the assessment. When the dependent variable becomes sundowning, the consideration for any assessment falls short and the opportunity for understanding is eliminated. The sun must set on the term sundowning, to allow aging individuals to be properly treated for what is actually happening rather than having their behaviors explained away through a pseudo-diagnosis. The title of this chapter focuses on the word twilight, or the time of day when the natural light fades and creates obscurity. The same obscurity surrounds the term sundowning. Perhaps there can be some light shed on this subject in an effort to create some clarity on proper diagnosis and effective treatment.

## CHAPTER 5

### DISCUSSION

The purpose of this dissent was not intended to evoke animosity from those in the field of elder care, but rather to provide understanding and the opportunity for improvement. The message being presented here may be interpreted as saying that the field of human services should be completely reconsidered, however, the intention is far from that. Rather, it is that the misuse of the term sundowning on behavior does have an impact on the older population it is being applied to resulting in a lower standard of care for these individuals. There were several points previously stated to support this point of view. First, sundowning is a descriptive term and is not a recognized as an official psychiatric diagnosis and while observations on sundowning are found in many professional journals, they have failed to agree on its conceptual existence. From this it is clear that the term already lacks diagnostic utility (i.e., the diagnosis does not inform any treatment). Second, research has determined that the possible causes of sundowning can consist of physiological, environmental, and psychological factors. Considering these causes is parsimonious and erodes its perception as a phenomenon. Third, the problem discussed by Skinner (1984) was that definitions, while providing a verbal community with a frame of reference, do not sufficiently establish a relationship between the term and the behaviors even when the verbal community supports the term. Not knowing the specific reason for someone's behavior only leads to assumptions and away from effective treatment. Fourth, in reference to the scientific process, Kazdin conveys that an experiment should be designed to rule out all but the most possible causes. More specifically, the operational design of the study has to show

the true relationship between the two variables rather than the effects of an outside influence. This is the scientific process that results in truth and understanding. A reanalysis of the sundowning, where the actual behaviors, and not the sun, are the focus, allow for that process to occur. Behavior has to be the consideration before analysis can begin.

To avoid being misconstrued, it is important to say that the misappropriated use of the term sundowning does not create an egregious act against mankind, but it does detract from a quality of life of the geriatric population that it is applied to. If the problem were accurately diagnosed as poor sleep or a strenuous activity schedule for example, the simple changes that could be made would certainly increase an individual's overall satisfaction. While life is full of aversive situations, it is of no service to ignore them in hope that they go away. To ignore the problem of the term sundowning is to create unnecessary aversive situations for older adults. Currently, almost any difficult behavior would be classified as sundowning if it occurred in the evening, most likely leading to a pharmacological intervention. Given that 2.4-66% of older adults engage in such behaviors (Bachman & Rabins, 2006; Khachiyants et al., 2011; Kim et al., 2005; Sharer, 2008), the chances are very good that the aging population will engage in these behaviors and receive medication prescribed specifically because of the sedating properties (i.e., the treatment will be a form of chemical restraint). A reanalysis of the term sundowning allows for a true analysis of the challenging behaviors older adults engage in and allows for a better opportunity to improve their lives and their environment.

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