Productive and Social Engagement following Driving Cessation: A Couple-Based Analysis

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Abstract

Drawing on interdependence theory, this study examined the cross-spouse impact of driving cessation on productive (work, formal volunteering, and informal volunteering) and social engagement of older couples age 65+ using longitudinal data from the Health and Retirement Study (1998 – 2010; *N* = 1,457 couples). Multilevel modeling results indicate that driving cessation reduced husbands’ productive and social engagement, and wives’ productive engagement. Spousal driving cessation reduced husbands’ likelihood of working or formal volunteering, and wives’ likelihood of working or informal volunteering. The more time since spousal driving cessation, the less likely husbands were to work and the less likely wives were to formally volunteer. Results suggest the need for greater recognition of the impact of driving cessation on couples, rather than just individuals, as well as the need for enhanced services or rehabilitation efforts to maintain driving even among couples with one remaining driver.

Keywords: driving cessation, engagement, employment, volunteering, married couples, dyadic study

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Transitions in aging are not experienced solely on an individual level, as social networks are important to many experiences across the life course (Christakis & Fowler, 2013). Spouses and partners, in particular, greatly impact how older individuals experience major life events, and may be profoundly affected by events occurring in their spouse’s life due to the interdependence of many older couples (Blieszner, 2007). The literature on later life is especially attentive to the linked nature of spouses’ lives in relation to health (Bookwala, 2005), happiness (Stull, 1988), and employment transitions (Henretta, O’Rand, & Chan, 1993; Ho & Raymo, 2009; Kim & Moen, 2002; Pienta, 2003). How driving transitions experienced within a marriage impact spouses is a largely neglected topic among gerontologists, although one study found that adaptation to driving cessation was more successful among older individuals who had a spouse who still drove (Burkhardt & Berger, as cited in Glasgow, 2000).

The importance of driving to older adults is well understood and documented (Rosenbloom & Herbel, 2009). Driving has significant consequences for personal autonomy and lifestyle choices (Whitehead, Howie & Lovell, 2006), productive engagement and social interaction (Curl, Stowe, Cooney, & Proulx, 2013), and health (Edwards, Lunsman, Perkins, Rebok, & Roth, 2009). Driving cessation is a major life transition that is likely important not just to individual partners in a relationship but to the couple as well, especially given that reliance on a spouse, if available, for transportation is well documented (e.g., Kostyniuk & Shope, 2003). Drawing on interdependence theory (Thibaut & Kelly, 1986), the present study focuses on productive and social engagement of older adults and extends previous research by examining a) the potential mitigating role of having a spouse who continues to drive for the spouse who ceases to drive, and b) the potential influence of spouses’ driving cessation on partners who continue to drive. Such an examination recognizes the interdependence between spouses and may suggest new avenues for programming focused on driving cessation in later life.

**Driving Cessation**

The importance of driving to older adults is especially salient in the United States, where more than 75% of the adult population lives in suburban or rural areas (Rosenbloom & Herbel, 2009) that may lack good public transportation or walkable neighborhoods with access to basic resources and services. Further, among persons age 65 or older, relocation to the suburbs is more likely than a move to the city (Frey, 2007), suggesting that the number of older adults in the suburbs will continue to rise. Although actual licensing patterns and previous driving experience are not addressed in many studies, research suggests that rates of driving licensure and actual miles driven are on the rise among older adults, especially women (Rosenbloom & Herbel), likely due to the aging of the baby boom generation. Consequently, the process of driving cessation will also be on the rise in the future. Driving cessation is linked to numerous risk factors, many of them related to increased age, such as diminishing health or eyesight, impaired cognition, and decreased comfort or confidence behind the wheel (especially for women; Emerson, 2012; Meng & Siren, 2012).

 A focus on the driving transitions of both spouses places emphasis on the interdependence between partnered couples (Rusbult & van Lange, 2003; Thibaut & Kelley, 1986). A central tenet of interdependence theory is that what impacts one individual in an intimate relationship is likely to impact the other partner (Thibaut & Kelley). This characteristic may hold especially true for phenomena that affect issues of autonomy, health, and wellbeing of the partners (e.g., driving cessation) as they age. Reliance on a partner for transportation support following driving cessation is a reasonable expectation, and may be an adaptive way of coping with the loss of a driver in the home. Research on later life driving suggests that spouses begin their reliance on one another prior to cessation, serving as co-pilots or navigators for each other (Kostyniuk & Shope, 1998). If reliance continues to occur post-cessation, the increased chauffeuring duties of the continuing driver may impact his or her availability for social and productive engagement opportunities. At the same time, for the spouse who has ceased driving, being able (or willing) to rely on a partner who still drives may allow for the maintenance of productive roles and social relationships.

 Research shows that caregivers, many of whom are driving spouses, spend a considerable portion of their caretaking time providing transportation (Park et al., 2013). With time a finite resource, this type of care provision may limit the driving spouse’s ability to engage in paid employment and volunteer and social activities. But the potential costs and benefits of living in a one-driver household, and how they differ for each spouse, extend beyond the concept of time use. Driving is intimately tied with autonomy in the United States (Whitehead et al., 2006), especially for men (Davidson, 2008), thus the availability of a driving spouse may not guarantee the use of that spouse for transportation assistance. In addition, because older women generally exhibit more limited driving (in terms of frequency, distance, and conditions under which they will drive) compared to men (Rosenbloom & Herbel, 2009), men may benefit less than women from the availability of a driving spouse upon driving cessation. Further, forms of productive and social engagement which are more rigidly tied to a schedule—such as paid employment—may be more difficult to engage in even if a driving spouse is available.

**Familial Transportation Assistance**

Family (e.g., spouses, adult children) are among top choices for transportation alternatives for many older adults after driving cessation (Kostyniuk & Shope, 2003), with spouses ranking highly as feasible transportation help among individuals with dementia (Adler, 2010). The availability and use of spouses for alternative transportation is influenced by the social landscape of marriage, health, and longevity for the two sexes. Men are more commonly married in later life than women (74.5% vs. 44.5%, respectively; U.S. Census Bureau, 2012), so when men cease to drive they are more likely than women to have a spouse who could provide transportation help (Rosenbloom, 2001). This may explain why early research found that men mainly obtained rides from family members, whereas women relied on family and friends alike (Carp, 1972). Still, women generally experience a lower level of mobility than men following driving cessation, though they tend to be in better health at cessation than men (Siren, Hakaimes-Blomqvist, & Lindeman, 2004; Siren & Hakamies-Blomqvist, 2006).

Findings regarding the associations between driving cessation and spousal availability are somewhat mixed. Choi, Adams, and Kahana (2012) did not find a significant association between cessation and receiving transportation support from a spouse for those living in retirement communities, after controlling for health and demographic factors. Stutts and colleagues (2001) found that older men are less willing than older women to accept transportation help from family members or friends. In contrast, older women report that they are more likely to stop driving if they have a spouse or other close family member available to help drive (compared to women who do not have family members available to help). Interestingly, recent studies show that married men are *less* likely to stop driving than their unmarried counterparts (Choi, Mezuk, Lohman, Edwards, & Rebok, 2012).

Limited work has explored the influence of spousal driving on outcomes, such as health, among newly transitioned former drivers. In longitudinal data from the Asset and Health Dynamics among the Oldest Old (AHEAD) study, having a spouse who continued driving did not protect against depressive symptoms for older non-drivers (Fonda, Wallace, & Herzog, 2001), contrary to the authors’ expectations. These investigators concluded that driving cessation may impact emotional wellbeing for reasons other than lack of transportation options—perhaps as a result of changes in identity or feelings of competence and independence that accompany driving cessation.

**Productive and Social Engagement**

 Previous research has established a pronounced effect of driving cessation on individuals’ engagement in old age (Curl et al., 2013). The likelihood of working, for example, declines by a profound 79% following driving cessation, even after controlling for health factors. Another study that offers possible insights into the impact of driving cessation on productive engagement for partners was a cross-sectional survey focused on California drivers whose licenses were revoked due to suspected dementia (Taylor & Tripodes, 2001). Following license revocation of a partner, the frequency of a couple’s social and recreational trips declined significantly, yet frequency of medical trips remained fairly consistent. Moreover, the results documented demands of caregiving, including providing transportation, for continuing drivers as 13% of caregivers (predominantly, but not exclusively, wives) left work entirely to provide care for the non-driving household member, and 42% reported frequently missing work due to caregiving duties.

Clearly, one way in which a partner’s driving cessation may impact the lifestyle and engagement of the driving spouse is through the added care tasks that cessation may present. Transportation assistance by caregivers is commonly reported in the literature, usually in studies on specific medical conditions or time periods during the care process (e.g., post-hospitalization). Kane, Renardy, Penrod, and Huck (1999), for example, reported that approximately 70% of caregivers provided transportation support six weeks after a hospitalization discharge, compared to 31% who provided support prior to hospitalization. More recently, Park and colleagues (2013) noted that among difficult and demanding caregiving tasks, transportation was second only to the additional household tasks for caregivers of spouses recovering from coronary artery bypass surgery. Finally, Adler, Rottunda, Bauer, and Kuskowski (2005) found that providing transportation assistance had a significant impact on women’s social engagement. Compared to those who lived with another driver, women who lived with a non-driver had fewer positive social interactions.

Due to the increased likelihood of facing chronic medical conditions and hospitalization as one ages, the caregiving demand of transportation provision appears to be of great importance to older couples (especially those in suburban and rural areas), and it may reduce driving spouses’ abilities to maintain levels of productive and social engagement. However, having a spouse who continues to drive might ameliorate some of the decline in engagement experienced by the non-driving spouse. The relevance of such assistance cannot be overlooked, as the importance of sustained productive engagement for good health and physical function is well established (Hinterlong, Morrow-Howell, & Rozario, 2007).

**Purpose**

The primary goal in this study is to explore the interdependence between spouses within the context of driving cessation in later life. A limitation of previous work on driving cessation by Taylor and Tripodes (2001) was the lack of precise data on the partner’s driving status, because their survey only assessed whether there were licensed drivers in the household and did not report their specific relationship to the individual whose license was revoked. A longitudinal examination of the impact of driving cessation among older couples, using a nationally-representative sample, is needed to better address the impact of a partner’s driving status on engagement, as well as one’s own driving status on the engagement of a partner. Using couple-level data from the Health and Retirement Study, a nationally representative study of non-institutionalized adults age 50 and over that includes data from spouses/partners regardless of age, the present investigation examines the impact of spousal driving cessation within couples. Specifically, this study seeks to better understand the impact of having a spouse who continues to drive on the engagement of the spouse who ceases to drive, and also the impact of having a spouse who ceases to drive on the engagement of the spouse who continues to drive. To achieve these goals, we pose two research questions:

**1**. Does having a driving spouse reduce the impact of one’s own driving cessation on productive and social engagement? Prior work demonstrates a robust association between driving cessation and reductions in productive and social engagement (Curl et al., 2013). But interdependence theory suggests that spouses may rely on one another for transportation assistance post-cessation. Thus, we hypothesize that having a driving spouse will mitigate but not completely eliminate the negative impact of driving cessation on productive and social engagement.

**2.** Does a spouse’s driving cessation impact productive and social engagement in older adults who still drive? Based on both the central tenet of interdependence theory – that what impacts one individual in an intimate relationship is likely to impact the other partner (Thibaut & Kelley, 1986) – and previous work that shows the potential for caregiving demands associated with a spouse’s driving cessation (e.g., Bakas et al., 2004), we hypothesize that having a spouse who stops driving will result in decreased productive and social engagement for the spouse who continues to drive.

Driving cessation is tied to health at the individual level, influencing a variety of factors from depressive symptoms to mortality (Edwards, Perkins, Ross, & Reynolds, 2009; Ragland, Satariano, & MacLeod, 2005). Additionally, driving limitations are known to be predicted by low income and limited functioning (Ragland, Satariano, & MacLeod, 2004), and driving cessation by chronic conditions and age (Foley, Hemovitz, Guralnik, & Brock, 2002; MacLeod et al., 2004). These individual-level predictors and consequences of driving cessation are likely important for older couples as well. Thus, factors known to be associated with driving cessation and engagement will be controlled, including age (Foley et al.), income (Ragland et al., 2004), education, gender (Chipman, Payne & McDonough, 1998), health, cognition, and minority status (Tang, Copeland, & Wexler, 2012).

**Methods**

**Data**

Longitudinal data from seven waves (each collected approximately two years apart, from 1998-2010) of the Health and Retirement Study (HRS) were used in this analysis. The HRS collected oversamples of Blacks, Hispanics, and Florida residents (Heeringa & Connor, 1995). We used longitudinal data files (version L) prepared by RAND Corporation in this analysis (St. Clair et al., 2011), along with raw variables on driving cessation, formal and informal volunteering, and social engagement pulled from the HRS (2011).

Pairs of respondents and spouses had to meet the following criteria to be included in the study:

1. Interviewed in 1998 (excluded 16,693 respondents);
2. Both partners had to be age 65 or older (excluded 8,952 cases), as the driving cessation variables were only asked of older adults;
3. Reported being able to drive at baseline (excluded 887 cases; those who volunteered that they had never driven [at any wave] were also excluded);
4. Household analysis weight greater than zero (excluded 1 case; St. Clair et al., 2011);
5. Opposite sex partners (excluded 2 cases; We use the terms “spouses,” “husbands” and “wives” throughout the paper to refer to both married and partnered couples.);
6. For subsequent waves, people were only included if they were still married/partnered, both spouses were interviewed and neither spouse had proxy data (excluded 606 cases at baseline), and both partners had complete data on the study variables (excluded 533 cases at baseline).

These criteria resulted in a final unweighted sample of 2,914 individuals (1,457 couples).

**Measures**

**Dependent variables**. Productive engagement was assessed with four variables available at each wave of the study. Paid employment was derived from RAND’s labor force status variable, which had seven response categories: working full-time, working part-time, unemployed, partly retired, retired, disabled, or not in the labor force. Respondents were coded as employed (= 1) if working full-time, part-time, or partly retired, otherwise paid employment was coded 0. Formal volunteering was assessed with the question “Have you spent any time in the past 12 months doing volunteer work for religious, educational, health-related or other charitable organizations?” (1 = *yes*, 0 = *no*). Informal volunteering was coded based on the question “Altogether, about how many hours did you spend in the past 12 months helping friends, neighbors, or relatives who did not live with you and did not pay you for the help?” Any hours greater than zero resulted in a code of 1, otherwise informal volunteering was coded 0.

Depending on whether the respondent lived in the community or in a nursing facility, respondents were asked "Do you have any good friends in or near the facility?" OR "Do you have any good friends living in your neighborhood?" (yes or no). If they answer "yes," then they are asked "How often do you get together with people in or near the facility just for a chat or for a social visit?" or "How often do you get together with any of your neighbors just to chat or for a social visit?" along with a follow-up question about the unit of time (i.e., per day, per week, etc.) for their response. Based on the frequency of contacts reported, we calculated a standardized variable for social engagement indicating days of contact per week, with a range of 0 - 7.

**Independent variables***.* Driving status was determined based on respondents’ answers to the question “Are you able to drive?” Responses were recoded as 1 = *no longer able to drive* and 0 = *still able to drive*. Additionally, a variable was created to indicate how many waves had passed since the *first* driving cessation that occurred during the study (coded 0, 1, 2, etc., to be consistent with the measurement of time). We also included variables for spouse’s driving status and waves since spouse’s first driving cessation. Time was indexed with the wave of data collection (0, 1, 2, etc.).

Two dummy variables were created for gender (Sayer & Klute, 2005): husband (1 = *yes*, 0 = *no*) and wife (1 = *yes*, 0 = *no*). These variables denote whose equation (husband’s or wife’s) is being modeled. Other demographic variables were coded as follows: race (0 = White/Caucasian, 1 = non-White), age (in years) at baseline, years of education (0 - 17+) at baseline, and couple income (total income from all sources for both spouses for each interview).

Physical and cognitive health for both spouses were also controlled. Cognitive ability was based on word recall, and ability to count backwards, identify an object by its description, give the date, and name the U.S. President and Vice President. A total cognitive ability score, ranging from 0 - 35, was computed by summing scores on these items. Higher numbers indicate greater cognitive functioning. For chronic conditions, respondents reported having been ever diagnosed by a doctor with any of seven major conditions (high blood pressure, diabetes, cancer, chronic lung disease, heart problems, stroke, or arthritis; St. Clair et al., 2011). Reported conditions were summed, with a range of 0 - 7. Respondents also reported any limitations with three instrumental activities of daily living (IADLs): using the telephone, managing money, and taking medications. “*Yes”* responses were summed; higher numbers on the 0 – 3 scale denote more IADL limitations. Self-rated health was based on responses to the question “Would you say your health is *excellent, very good, good, fair,* or *poor*?” (0 – 4 range; higher = better health).

Education, age, cognitive ability and couple income were transformed to aid in model convergence and intercept interpretation in the multivariate analyses. Education and total cognitive ability were grand mean centered. Age was centered by subtracting the minimum age (65, due to sample selection criteria) from all values. Household income was transformed due to skew; a value of 100 was added to all values before applying a natural log transformation; this logged variable was then grand mean centered.

**Missing Data**

Both the Institute for Social Research at the University of Michigan and the RAND Corporation used multiple strategies to reduce or impute missing data (St. Clair et al., 2011). After applying the sample selection criteria (except deletion due to missing data), there were minimal missing data. The measure for informal volunteering had the most missing data at any given wave: 22 observations at baseline (1.5% of cases at baseline). Five other variables (formal volunteering, self-rated health, cognitive ability, IADL limitations, and driving status) had between 0 and 11 missing observations per wave. Given the relatively small amount of missing data, no imputation was performed. Instead, couples where one or both spouses had missing data were eliminated from the analyses for that wave.

**Data Analysis**

 This longitudinal, dyadic study involves repeated measures within couples, and thus data are hierarchical in nature. Data were analyzed using multilevel modeling (MLM) with HLM 6.08 software and full maximum likelihood estimation. This approach is ideal, as MLM computes corrected standard errors and retains cases for any wave with complete data. Optimal Design 1.77 (Liu, Spybrook, Congdon, Martinez, & Raudenbush, 2006) calculations indicate that the power for this study exceeded 0.80 (assuming alpha < 0.05, up to seven repeated measures, two individuals within each couple, minimum of 440 couples at Level-2, ICC > 0.05, and effect size of 0.20).

 The longitudinal multivariate outcomes or dual-intercepts model (Sayer & Klute, 2005) estimates separate regression lines for husbands and wives simultaneously, while controlling for within-dyad dependence in the four outcomes. With the dual-intercepts approach to modeling dyadic data there are two levels (i.e., within dyads and between dyads; Cook & Kenny, 2005; Sayer & Klute), rather than three (i.e., time, individual, couple). For this study, the HLM default intercept was deleted and gender indicator variables were entered for husband and wife at Level-1. Husbands and wives also had separate variables for time since baseline (i.e., rate of change in the outcome per wave). The Level-1 model represented the effects of time and time-varying predictors on the outcomes, while the Level-2 model captured the moderation effects of time-invariant individual- and couple-level predictors (e.g., education, race) on the relationship between the Level-1 predictors and the outcomes (Raudenbush & Bryk, 2002; Sayer & Klute).

 This study utilized nested models. For the analyses, the distribution of social engagement was treated as a count of days of social contact and thus estimated using Poisson regression. Paid employment, formal volunteering, and informal volunteering were all estimated as Bernoulli (dichotomous, 0 or 1) outcomes. Across dependent variables, the baseline model (Model 1) consisted of the husband and wife intercepts and time slopes, plus the demographic variables (couple income, education, age, race; and the interactions between the slope and race, education, and age [which capture how these variables impact the outcomes over time]), physical health (chronic conditions, self-rated health, IADL limitations) and cognitive ability predictors. The intercepts were entered as fixed and random effects, while all other predictors were entered as fixed main effects. Model 2 added the respondents’ driving cessation variables (not able to drive and waves since driving cessation). Model 3 added the cross-spouse effects of driving cessation (spouse driving cessation and waves since driving cessation), plus the spouse’s physical health and cognitive ability variables. All the predictors were entered in the models as time-varying, with the exception of gender, race, education, and age at baseline. The abridged formula for Model 3 is as follows:

η = γ10\*(Husband/Wife Intercept) + γ11\*(Other race, Education, Age) + γ20\*(Husband/Wife Slope) + γ21\*(Other race, Education, Age) + γ30\*(Respondent Not Able to Drive) + γ40\*(Respondent Waves since driving cessation) + γ50\*(Spouse Not Able to Drive) + γ60\*(Spouse Waves since driving cessation) + γ70\*(household income, physical and mental health; spousal physical and mental health) + μ10\*(Husband/Wife)

where η is the probability of the outcome conditional on the model predictors at time *t* for dyad *i*; γ50 and γ60 will be used to answer the study hypotheses about the impact of driving cessation on engagement; γ11 are main effects of race, age, and education at baseline; γ21 are interaction effects of race, age and education over time; and μ10 are the random effects for the intercepts.

**Results**

 Table 1 presents weighted and unweighted descriptive statistics for the study variables at baseline, for husbands and wives. The mean age was 73.9 for husbands and 71.5 for wives, and husbands and wives had a mean of 12.7 years of education. Most respondents (65% of husbands and 59% of wives) were engaged in informal volunteering, compared to about 40% for formal volunteering. A quarter (25%) of husbands and 15% of wives were engaged in paid employment. For social engagement, husbands and wives reported social contact with friends or neighbors about two days per week at baseline. Over the course of the study, driving cessation was reported by 421 of the 1,457 couples (158 couples for which the husband ceased driving, 228 couples for which the wife ceased driving, and 35 couples for which both spouses stopped driving).

 Multivariate models estimating the impact of driving cessation on productive and social engagement are presented in Table 2 (husbands) and Table 3 (wives). Odds ratios (O.R.) greater than 1.0 indicate a greater likelihood or “risk” of experiencing the outcome (employment or volunteering) when all of the other predictors are zero, while an odds ratio of less than 1.0 indicates a reduced risk. Similarly, event rate ratios (E.R.R.) greater than 1.0 indicate that the predictor increases the estimated number of social contacts when all other predictors are zero, while those less than 1.0 reduces the estimated number of social contacts.

 The likelihood of older persons engaging in paid employment declined over time (as indicated by the significant odds ratios that are less than 1.00 for the time slope variables in Model 1) and wives’ likelihood of informal volunteering and social engagement also declined, though the latter outcome was less pronounced. The significant coefficients for respondent driving cessation (i.e., not able to drive) for three of the four outcomes in Model 2 indicate that driving cessation reduced productive engagement in older age for both husbands and wives. Respondent driving cessation did not significantly impact social engagement in Model 2. The random intercepts were statistically significant for all four outcomes for both husbands and wives, indicating the existence of unexplained variance in the outcomes between individuals at baseline, even after controlling for all predictors.

We hypothesized that having a driving spouse would mitigate but not eliminate the negative impact of driving cessation on engagement. To test this, we compared the magnitude and *p*-values of the odds ratios and event rate ratios for respondent driving cessation and waves since driving cessation from Model 2 (when spousal driving variables were not in the model) and Model 3 (when spousal driving and spousal health variables were added to the model). We found that one’s own driving cessation as an influence was slightly amplified for paid employment and formal volunteering for both husbands and wives when a spouse still drove. However, having a driving spouse does mitigate the negative impact on informal volunteering (O.R. change from .26 to .40 for husbands and from .55 to .59 for wives), and one’s own driving cessation still had a significant negative impact on all three productive engagement outcomes when controlling for spouse driving status (as well as spouse’s health and cognitive status). This indicates partial support for hypothesis 1. Further, the negative impact of husbands’ driving cessation on social engagement was not statistically significant (*p* = .06) until controlling for spouse driving status (although spouse driving status was not statistically significant), *p* < .05).

In addition to our hypothesis about the cross-spouse mitigation of negative consequences, we examined whether spousal driving cessation influenced productive and social engagement for the respondent, when controlling for spousal health and cognitive ability. This is determined by examining the coefficients for spouse’s waves since driving cessation and spouse not able to drive (Model 3), when own driving variables (and other predictors) are set to zero. The results indicate that a wife’s driving cessation reduced her driving husband’s likelihood of paid employment and formal volunteering, and the longer it had been since she reported ceasing to drive, the less likely the husband was to work. Wives’ driving cessation was not significantly related to driving husbands’ likelihood of informal volunteering or social engagement. A husband’s driving cessation had a negative impact on paid employment for wives who drove, but this effect did not change over time. However, a husband’s driving cessation reduced his wife’s likelihood of informal volunteering both short-term and long-term, while **increasing** the amount of her social engagement over time. Husband driving cessation did not significantly impact his wife’s formal volunteering either short-term or long-term.

Poor spousal health reduced husbands’ social engagement and odds of paid employment, while increasing his odds of both formal and informal volunteering. For wives, having a spouse with more chronic conditions reduced her likelihood of formal volunteering, while higher spousal cognitive ability increased her likelihood of informal volunteering.

 Graphs shown in Figure 1 illustrate, as an example, expected productive engagement in terms of paid employment of older spouses over time, based on final multivariate models for husbands and wives. These graphs compare the trajectories of engagement for those who can still drive and those unable to drive, as of 2002. Because driving cessation has both a short-term and long-term impact, we set the occurrence of driving cessation early enough in the time series to capture both effects in this illustration. As shown, driving cessation of the husband reported at Wave 3 (2002) has an immediate marked impact on his likelihood of employment short-term, and his wife’s driving cessation has both short-term and long-term negative effects. For wives, both own driving cessation and spousal driving cessation have immediate negative effects on paid employment, but the odds of wives working prior to either spouse experiencing driving cessation were already much lower than that of husbands.

**Discussion**

 This study examined the impact of driving cessation within a couple framework. Specifically, we considered the impact of driving behaviors on productive and social engagement within couples in two ways: one, the effect of having a spouse who continues to drive when one partner ceases driving, and two, the impact of having a spouse who ceases to drive when one partner continues to drive. Similar to previous work (Curl et al., 2013), we found a significant reduction in engagement when an individual ceases to drive. Moreover, in answering our two research questions, we found partial support for spousal interdependence, with significant spouse effects emerging for both the driving and non-driving partner. We explore these findings in detail below.

 In answer to research question one, we found that the negative impact of one’s own driving cessation on informal volunteering was reduced for both husbands and wives when their partner continued to drive. Thus, we found partial support for our hypothesis that having a spouse who drives somewhat mitigates, but does not completely eliminate, the negative impact of driving cessation on one form of engagement. The protective effect of having a spouse who drives was fairly minimal for wives, and moderate for husbands, suggesting that even in households in which one spouse continues to drive, the spouse who cannot is likely to experience limitations in informal volunteering—with this applying to both men and women. As earlier literature suggests, men may somewhat resist dependence on their wives for driving assistance, because of an emphasis on male independence and autonomy – characteristics that driving facilitates (Davidson, 2008). It is less clear why having a husband who still drives does not mitigate as strongly the negative effects of cessation on wives' informal volunteering. Perhaps this finding has more to do with the form of engagement being considered than driving assistance itself. Specifically, male drivers may have less interest in participating in informal volunteering than women because such behavior is a less central activity over the life course for men than women (Gerstel, 2000). Thus, for a wife who has recently transitioned to non-driver status, it may be more difficult to get her driving husband to agree to transport her for such purposes. Future research should further explore this finding to better understand if women are reluctant to rely on their spouses for transportation assistance, or if spouses are reluctant to provide it in these specific situations.

 For social engagement, the impact of spouses’ driving status had a small amplifying effect for husbands, but there was no effect for wives. Perhaps wives who are still able to drive are providing transportation support for their husbands, which takes them out of their immediate neighborhood, so social contact with neighbors is reduced. Alternatively, husbands may experience greater depressive symptomatology post-driving cessation (Fonda et al., 2001) if their wives are still able to drive, and this could explain their reduction in social engagement. It could also be that the reasons for ceasing to drive make engagement difficult. Although we controlled for some of the health factors likely to be related to driving cessation, it is possible that the process of treating and coping with these health concerns and changes creates time demands that take away from the forms of engagement studied here.

 In their study on the associations between driving cessation and depression, Fonda and colleagues (2001) found that having a spouse who continued to drive did not protect respondents from the negative effect of driving cessation on psychological wellbeing. Our findings show that the negative impact of driving cessation extends to the realm of productive engagement, even when a partner has the ability to drive. Taken together, these findings point to the strong associations between driving cessation, wellbeing, and engagement in later life, raising considerable concern about the wellbeing of those individuals who must cease to drive in older age—even when they are married to someone who continues to drive and potentially can provide them with some transportation assistance. Thus, our findings suggest a strong link between independence, at least in the sense of being able to drive oneself, and productive engagement in U.S. society.

 In examining our second research question, we found that when one’s spouse ceased driving, one’s own likelihood of paid employment was reduced. Although this initial impact existed for both husbands and wives, the time variable was significant for husbands only: the longer it had been since his wife’s driving cessation, the less likely he was to work. To our knowledge, this is the first study to provide evidence for the potential couple-level economic impact of driving cessation—when a spouse ceases to drive, it negatively impacts both their own and their spouses’ likelihood of working for pay, potentially limiting the economic resources of the couple. Because most older Americans rely on driving themselves to work (Glasgow, 2000), it is likely the case that ceasing to drive makes paid employment significantly more difficult. For the spouse who can drive, it is possible that providing transportation assistance for their non-driving spouse interferes with work responsibilities. The work-family conflict that ensues is likely to make employment increasingly difficult and less desirable, potentially leading the driving spouse to retire (Kubicek, Korunka, Hoonakker, & Raymo, 2010). Future research should further explore this impact—both in terms of the impact on income and wealth, and also in terms of *why* this pattern of findings occurs. Are spouses ceasing work so that they can provide care and transportation for the non-driving spouse? Or do they stop working because employment is increasingly difficult and less desirable when their spouse is at home? Previous research suggests that the former may be the case (e.g., Taylor & Tripodes, 2001) but additional research on this phenomenon is needed.

 A spouse’s driving cessation impacted the driving partner’s engagement in additional realms, although these differed somewhat for men and women. When a wife ceased driving, her husband’s likelihood of formal, but not informal, volunteering was reduced. It is possible that within marriage, wives are the primary force behind formal volunteer work (Rotolo & Wilson, 2006). Our findings for wives versus husbands provide potential evidence for this, as husbands’ driving cessation did not significantly impact wives’ formal volunteering. Thus, it is possible that when husbands cease driving, they no longer have the motivation to maintain formal volunteering connections. It is also possible that when prioritizing driving needs after a wife’s cessation, those activities that involve individuals closest to the couple—family, friends, and neighbors—take precedence over more formal connections, and thus those activities are more likely to be maintained. Future research should explore these possibilities within dyads more thoroughly.

 Husbands’ driving cessation reduced wives’ likelihood of informal volunteering, both short-term and long-term, but increased wives’ social engagement over time, although not immediately. These findings are in line with previous work that found that women drivers who live with someone who does not drive engaged in less positive social interaction than those who lived with someone who still drove (Adler et al., 2005). It is possible that given husbands’ reliance on wives for transportation assistance after driving cessation (Carp, 1972; Rosenbloom, 2001), that women have difficulty maintaining social and informal volunteering connections. The demands of caregiving for husbands, in terms of providing transportation assistance, may replace free time women had for these forms of productive and social engagement. Meeting the demands of a household, such as running errands, may also impede the lone driver’s ability to engage in social connections. It is also possible that in light of their husbands being unable to drive, and thus unable to go out when and where they please, wives feel pressured to stay with their husbands, either to keep them company or to reduce their own feelings of guilt about their independence in the face of their husbands’ decreased independence. This latter scenario may be more likely in cases in which informal volunteering and social engagement were not activities that spouses jointly engaged in prior to driving cessation. Lastly, research shows that even in older couples in which both partners are licensed to drive, the male spouse is typically the primary driver (Rosenbloom & Herbel, 2009), and studies indicate that female drivers are more likely than male drivers to use strategies to avoid driving (Bauer, Adler, Kuskowski, & Rottunda, 2003). Thus, it is possible that if a husband who was the primary driver in a marriage ceases to drive, his wife’s social and productive engagement will decline because she chooses not to increase her driving.

 The current study has several strengths, including the use of a large sample of nationally representative data that were both dyadic and longitudinal. In addition, we were able to account for both spouses’ driving status, filling a critical gap in the literature to date. Our study also found empirical support for interdependence theory in the area of driving cessation of couples—that is, the circumstances of one partner clearly impact those of the other partner, although this impact differs somewhat by gender.

 Nonetheless, this study also had some limitations. Given the study design, we were unable to account for the dyadic timing of cessation (i.e., the exact space of time between spouses’ cessation) and had no explicit data available regarding reliance on other (non-spousal) drivers for transportation assistance. We also had some measurement limitations, in that our driving measure only assessed whether respondents were able to drive, not whether they have in the past or do now actually engage in driving, and, if so, how frequently. (HRS now includes a question about whether respondents had driven in the past month (yes/no), but this variable was only available for 2006-2010.) In addition, the social contact measure assessed frequency of contact with those who were in relatively close proximity, leaving us unable to assess how often non-drivers and their driving spouses may engage with those who live a considerable distance away. The HRS does contain some additional social engagement questions, but these were not assessed in a sufficient number of waves to be included in this analysis (e.g., attending religious services, attending non-religious meetings or programs of groups, clubs, or organizations). Frequency of contact with adult children who did not live in the home by the respondent OR the spouse/partner was asked at every wave, but because of the way the question is worded the engagement could be entirely conducted by one's spouse rather than the respondent, thus we did not use this variable in our analyses, which focused on the separate results for wives and husbands.

**Conclusion**

Our findings support interdependence theory and point to the importance of recognizing the impact of driving cessation on individuals and spouses even when one partner is still able to drive. Thus, older couples and their families should be alerted to the reality of reduced engagement—for both spouses—when preparing for an older spouse to cease driving. Our findings also point to the need for more alternative driving options or planned communities that provide non-drivers with social enrichment, volunteer opportunities, and businesses such as grocery stores, pharmacies, and medical care. Walkable communities and/or adequate transportation resources for older adults are critical to their maintaining good health and function, as evidenced by research revealing significant longitudinal effects of productive engagement on physical wellbeing (Hinterlong et al., 2007). Not only would these increased options and opportunities help the spouse who has ceased driving, they have the potential to help the spouse who continues to drive by alleviating some of the transportation and caregiving burden placed on them by living with a non-driver. Given that our findings highlight the interdependence between spouses, it seems plausible that interventions or policies surrounding driving cessation may impact both spouses, even if only one has ceased driving.

Future research should further explore why a spouse’s driving cessation has the impact it does on the spouse who still drives. Given the potential economic and social impact of one partner’s cessation, knowing more about the mechanisms behind this impact could better inform policy and practice with older adults and their families.

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Table 1

*Distribution of Study Variables at Baseline, Unweighted (N=1,457 Couples) and Weighted*

|  |  |  |
| --- | --- | --- |
|  | Husbands | Wives |
|  | Unweighted | Weighted | Unweighted | Weighted |
| Study Variable | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) |
| Racea | 5.6% | 3.6% | 5.7% | 3.6% |
| Education  | 12.73 (3.05) | 12.79 (3.00) | 12.72 (2.40) | 12.77 (2.37) |
| Age  | 73.90 (5.40) | 73.94 (5.27) | 71.47 (5.01) | 71.50 (4.88) |
| Household income  | 48844 (49267) | 49789 (52859) | 48844 (49267) | 49789 (52859) |
| Chronic conditions | 1.77 (1.26) | 1.78 (1.25) | 1.51 (1.13) | 1.50 (1.12) |
| Self-rated health | 2.16 (1.12) | 2.16 (1.11) | 2.32 (1.04) | 2.33 (1.04) |
| IADL limitations | .06 (.28) | .06 (.27) | .02 (.14) | .02 (.14) |
| Cognitive ability | 22.35 (4.52) | 22.44 (4.45) | 23.92 (4.44) | 24.04 (4.34) |
| Paid employmentb | 25.1% | 25.5% | 15.2% | 15% |
| Formal volunteeringc | 40.0% | 38.4% | 41.5% | 41.2% |
| Informal volunteeringc | 65.1% | 64.9% | 59.2% | 59.2% |
| Social engagementd | 1.78 (2.29) | 1.74 (2.25) | 1.78 (2.29) | 1.74 (2.25) |

*Note*. a1=non-White, b1=working, c1=yes, ddays per week.

Table 2

*Multilevel Model Results Predicting Productive and Social Engagement From Driving Cessation and Other Factors for Husbands*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | PAID EMPLOYMENT | FORMAL VOLUNTEERING | INFORMAL VOLUNTEERING | SOCIAL ENGAGEMENT |
|   |  1 |  2 |  3 |  1 |  2 |  3 |  1 |  2 |  3 |  1 |  2 |  3 |
| FIXED EFFECTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intercept | 0.40\*\* | 0.40\*\* | 0.57\* | 0.52\*\* | 0.51\*\* | 0.41\*\* | .52\*\* | .51\*\* | 2.75\*\* | 1.19\* | 1.19\* | 1.19 |
| Slope | 0.72\*\* | 0.72\*\* | 0.72\*\* | 1.02 | 1.01 | 1.04 | 1.02 | 1.01 | 0.88\*\* | 1.02 | 1.02 | 1.03 |
| Couple income (logged, centered)a | 1.84\*\* | 1.83\*\* | 1.85\*\* | 1.21\*\* | 1.21\*\* | 1.19\*\* | 1.21\*\* | 1.21\*\* | 1.05 | 0.98 | 0.98 | 0.98 |
| Education (centered) | 0.96 | 0.97 | 0.97 | 1.07\*\* | 1.08\*\* | 1.07\*\* | 1.07\*\* | 1.08\*\* | 0.99 | 1.00 | 1.00 | 1.00 |
| Age | 0.92\*\* | 0.92\*\* | 0.92\*\* | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.92\*\* | 1.00 | 1.00 | 1.00 |
| Other race (1=NonWhite) | 1.13 | 1.15 | 1.09 | 0.95 | .96 | 1.00 | 0.95 | 0.96 | 0.94 | 0.93 | 0.93 | 0.94 |
| Chronic conditions | 0.86\*\* | 0.86\*\* | 0.85\*\* | 0.86\*\* | 0.88\*\* | 0.84\*\* | 0.86\*\* | 0.88\*\* | 0.89\*\* | 0.99 | 0.99 | 0.97 |
| Self-rated health | 1.28\*\* | 1.28\*\* | 1.30\*\* | 1.29\*\* | 1.28\*\* | 1.27\*\* | 1.29\*\* | 1.28\*\* | 1.25\*\* | 1.04\* | 1.04\* | 1.04\* |
| IADLs | 0.64\*\* | 0.71 | 0.72 | 0.76\*\* | 0.89 | 0.92 | 0.76\*\* | 0.89 | 0.77\* | 0.87\*\* | 0.91 | 0.91 |
| Cognitive ability (centered) | 1.04\*\* | 1.03\*\* | 0.99 | 1.05\*\* | 1.04\*\* | 1.04 | 1.05\*\* | 1.04\*\* | 1.00 | 1.01 | 1.01 | 1.01 |
| Time\*Education | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.00 | 1.00 | 1.00 |
| Time\*Age | 0.99 | 0.99 | 0.99 | 0.99\*\* | 0.99\*\* | 0.99\* | 0.99\*\* | 0.99\*\* | 0.99\* | 1.00 | 1.00 | 1.00 |
| Time\*Other race | 1.05 | 1.05 | 1.06 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 0.94 | 0.95 | 0.96 | 0.95 |
| Not Able to Drive (1=yes) |  | 0.32\*\* | 0.29\*\* |  | 0.26\*\* | 0.23\*\* |  | 0.26\*\* | 0.40\*\* |  | 0.83 | 0.82\* |
| Waves since Driving Cessation |  | 0.99 | 0.96 |  | 1.02 | 0.97 |  | 1.02 | 0.80 |  | 0.89 | 0.88 |
| Spouse waves since driving cessation |  |  | 0.53\* |  |  | 0.85 |  |  | 0.86 |  |  | 0.99 |
| Spouse not able to drive |   |   | 0.36\* |   |   | 0.50\*\* |   |   | 0.77 |   |   | 0.92 |
| Spouse cognitive ability |  |  | 1.01 |  |  | 1.03 |  |  | 1.00 |  |  | 1.01 |
| Spouse self-rated health |  |  | 0.86\*\* |  |  | 1.11\* |  |  | 1.09\* |  |  | 1.01 |
| Spouse IADLs |  |  | 1.13 |  |  | 0.96 |  |  | 1.17 |  |  | 0.89\* |
| Spouse chronic conditions |  |  | 1.00 |  |  | 1.02 |  |  | 1.05 |  |  | 1.00 |
| RANDOM COMPONENT |  |  |  |  |  |  |  |  |  |  |  |  |
| Intercept | 3.90\*\* | 3.90\*\* | 3.89\*\* | 3.51\*\* | 3.51\*\* | 3.49\*\* | 1.29\*\* | 1.27\*\* | 1.26\*\* | 0.86\*\* | 0.86\*\* | 0.87\*\* |
| *Note*. Convergence criterion = 0.0001; full maximum likelihood estimation. *N* = 1,457. aOne value was calculated for both husbands and wives. \**p* < .05. \*\**p* < .01. |

Table 3

*Multilevel Model Results Predicting Productive and Social Engagement From Driving Cessation and Other Factors for Wives*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | PAID EMPLOYMENT | FORMAL VOLUNTEERING | INFORMAL VOLUNTEERING | SOCIAL ENGAGEMENT |
|   |  1 |  2 |  3 |  1 |  2 |  3 |  1 |  2 |  3 |  1 |  2 |  3 |
| FIXED EFFECTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intercept | 0.14\*\* | 0.14\*\* | 0.18\*\* | 0.42\*\* | 0.44\*\* | 0.48\*\* | 0.42\*\* | 0.44\*\* | 1.36 | 1.25\*\* | 1.24\*\* | 1.25\* |
| Slope | 0.75\*\* | 0.75\*\* | 0.77\*\* | 1.03 | 1.04 | 1.09\* | 0.42\*\* | 0.44\*\* | 0.82\*\* | 0.96\*\* | 0.96\* | 0.98 |
| Couple income (logged, centered)a | 1.84\*\* | 1.83\*\* | 1.85\*\* | 1.21\*\* | 1.21\*\* | 1.19\*\* | 1.21\*\* | 1.21\*\* | 1.05 | 0.98 | 0.98 | 0.98 |
| Education (centered) | 0.94 | 0.94 | 0.94 | 1.08\*\* | 1.09\*\* | 1.09\*\* | 1.08\*\* | 1.09\*\* | 1.06\*\* | 1.00 | 1.00 | 1.00 |
| Age | 0.90\*\* | 0.90\*\* | 0.90\*\* | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.95\*\* | 1.00 | 1.00 | 1.00 |
| Other race (1=NonWhite) | 3.48\*\* | 3.39\*\* | 3.47\*\* | 2.18\* | 2.15\* | 2.29\*\* | 2.18\* | 2.15\* | 1.03 | 0.94 | 0.94 | 0.94 |
| Chronic conditions | 0.84\* | 0.85\* | 0.85\* | 1.00 | 1.00 | 1.01 | 1.01 | 1.01 | 0.98 | 0.99 | 0.99 | 0.99 |
| Self-rated health | 1.25\*\* | 1.24\*\* | 1.23\*\* | 1.24\*\* | 1.21\*\* | 1.23\*\* | 1.24\*\* | 1.21\*\* | 1.18\*\* | 1.00 | 1.00 | 1.00 |
| IADLs | 0.78 | 0.95 | 0.96 | 0.63\*\* | 0.71\* | 0.71\* | 0.63\*\* | 0.71\* | 0.76\* | 0.85\*\* | 0.83\*\* | 0.82\*\* |
| Cognitive ability (centered) | 1.03\* | 1.03 | 1.02 | 1.05\*\* | 1.05\*\* | 1.02 | 1.05\*\* | 1.05\*\* | 1.03 | 1.01 | 1.01 | 1.00 |
| Time\*Education | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.00 | 1.00 | 1.00 |
| Time\*Age | 0.99 | 0.99 | 0.99 | 0.98\*\* | 0.98\*\* | 0.98\*\* | 0.98\*\* | 0.98\*\* | 1.00 | 1.00 | 1.00 | 1.00 |
| Time\*Other race | 0.88 | 0.89 | 0.91 | 0.79\*\* | 0.79\*\* | 0.80\* | 0.79\*\* | 0.79\*\* | 0.90 | 0.94 | 0.94 | 0.94 |
| Not Able to Drive (1=yes) |  | 0.29\*\* | 0.28\*\* |  | 0.55\*\* | 0.51\*\* |  | 0.55\*\* | 0.59\*\* |  | 1.17 | 1.17 |
| Waves since Driving Cessation |  | 1.13 | 1.07 |  | 0.93 | 0.88 |  | 0.93 | 0.78 |  | 0.95 | 0.94 |
| Spouse waves since driving cessation |  |  | 0.95 |  |  | 0.78 |  |  | 0.77\*\* |  |  | 0.91 |
| Spouse not able to drive |   |   | 0.46\*\* |   |   | 0.74 |   |   | 0.66\*\* |   |   | 1.17\* |
| Spouse cognitive ability |  |  | 1.05 |  |  | 1.01 |  |  | 1.04\* |  |  | 1.00 |
| Spouse self-rated health |  |  | 0.94 |  |  | 1.02 |  |  | 1.02 |  |  | 1.01 |
| Spouse IADLs |  |  | 1.12 |  |  | 1.15 |  |  | 0.98 |  |  | 0.98 |
| Spouse chronic conditions |  |  | 0.92 |  |  | 0.89\* |  |  | 1.03 |  |  | 0.97 |
| RANDOM COMPONENT |  |  |  |  |  |  |  |  |  |  |  |  |
| Intercept | 3.94\*\* | 3.93\*\* | 3.96\*\* | 3.46\*\* | 3.46\*\* | 3.44\*\* | 1.22\*\* | 1.22\*\* | 1.21\*\* | 0.95\*\* | 0.95\*\* | 0.95\*\* |
| *Note*. Convergence criterion = 0.0001; full maximum likelihood estimation. *N* = 1,457. aOne value was calculated for both husbands and wives. \**p* < .05. \*\**p* < .01. |

Figure 1

*Differences in Couple Trajectories of Drivers vs. Non-Drivers for Paid Employment*