I am writing to apply for the following awards for the 2011-2012 year: 1) the Mary Ellen McFarland Assistantship, 3) the M. Janice Hogan Fellowship, and 4) the Eva Donelson Wilson Fellowship. This application is organized by how I meet the major criteria necessary to qualify for these awards.

A criterion for all awards includes **excellent student standing**. Since I began my graduate training (September, 2007), I have successfully earned my MA degree (2009), passed both of the required written examinations for my PhD (2010, 2011), am in the process of scheduling my preliminary oral defense (2011), and have overall maintained a cumulative GPA of 3.9. I have earned no incompletes. I have met program milestones early (e.g., passed Critical review examination in my first semester of the PhD program). At the end of this semester (2nd year PhD program), I will have completed all of my course requirements. I have gained a variety of research and teaching experiences, including following through with each of my degree requirements (thesis, critical exam, special project) by submitting manuscripts to the top journals in our field (including the *Journal of Marriage and Family*, the *Journal of Family Theory & Review*, and the *Journal of Family Psychology*). I have had the opportunity to guest lecture for several classes, and give presentations at the National Council of Family Relations, Theory Construction and Research Methods workshop, as well as at our own Family Social Science Colloquium (*see abbreviated vita for details*). Altogether, the excellent progress I have made in the program points to my steady **scholarly development and productivity**.

A second major criterion for all awards includes completion of a **major research study**. I then have a clear and organized timeline to complete my dissertation by **May, 2012**. To begin, I have identified my research questions. Building on my program of research (thesis, critical exam, special project), my overall goals are to **further our understanding on what contributes to sibling similarity and difference in adolescent substance use**, by partialing out and explaining sources of both shared family and nonshared environmental effects.

**Background and Significance.** Adolescent siblings are often similar in their substance use (McGue, Sharma & Benson, 1996; Rende et al., 2005; Rowe & Gulley, 1992). Understanding why siblings are similar or different in their substance use is important because it can give us some insight on the etiology of substance use, as well as how to potentially reduce substance use amongst adolescents. The behavioral genetics methodology is particularly useful to incorporate in understanding sibling similarity because it partials out sibling similarity due to shared genetic, shared familial, and nonshared environmental effects.

Variables that explain a significant proportion of estimates for the shared family environment are important for two reasons. First, shared environmental affects often correspond to family effects. Specifically, they contribute to sibling similarity due to a common rearing environment. Though shared environment estimates are smaller in size compared to estimates of additive genetics, they do have moderate to strong effects, particularly in adolescence (e.g., Hopfer, Crowley & Kewitt, 2003; McGue, Elkins & Iacono, 2000; McGue et al., 1996). For example, McGue et al. (2000) found shared environmental effects explained 40-60% of the variance in adolescent substance use. Second, while we cannot change genetic predispositions or other fixed predictors to reduce the likelihood of substance use, it is especially useful to understand what exactly contributes to estimates of the shared environment in order to understand and potentially manipulate aspects of the family environment to reduce adolescent substance use.

Sibling effects have been shown to be stronger than those of parents in explaining shared environmental variance in adolescent substance use (Fagan & Najman, 2005; McGue & Iacono, 2009) and various other adjustment outcomes (Bussell, Neiderhiser, Pike, Plomin, Simmons, Howe, Hetherington, Carroll & Reiss, 1999; Feinberg, Neiderhiser & Hetherington, 2001; Pike et al., 1996). That is, while genetic variance explains most of the relationship between parent and child similarity in outcomes, shared environmental variance explains most of the relationship for sibling similarity in various outcomes in adolescence (Neiderhiser et al., 2007). This points to the importance of understanding and assessing the sources of sibling environmental influences in particular to further our understanding on the shared environmental contributions to adolescent substance use.
There is some evidence that siblings are more similar in their substance use if their relationship is warm and close (Rende et al., 2005; Rowe & Gulley, 1992), potentially because they share the same friends (Samek & Rueter, 2011). Moreover, sibling closeness has been found to moderate the association between additive genetic and shared environmental effects on sibling tobacco use, such that shared environmental effects were stronger when siblings were close, and genetic effects strong when siblings were less close (Slomkowski et al. 2005). This suggests that warm and close sibling relationships may contribute to shared environmental effects. Additional sources of the shared and nonshared environment that could help explain sibling similarity and difference in substance use may include other characteristics of sibling and parent-child relationship quality (communication and conflict patterns), as well as the discordant experience of major life events (e.g., being bullied), which have also found to associate with adolescent substance use patterns (Wills, Vaccaro & McNamara, 1992, Windle, 1992), and general adolescent adjustment outcomes (Steinberg, 2001).

**Specific Aims and Expected outcomes.** Overall, I expect to further understanding on the familial contributions to adolescent substance use by examining which characteristics of sibling and parent relationship quality explain a significant proportion of shared environmental estimates. That is, I expect to clarify what specific components of the family environment contribute to adolescent substance use that are not confounded by genetic effects (which, historically, family science has largely ignored). My specific aims and expected outcomes are as follows:

- **Aim 1:** Determine the best measurement strategy for analyzing patterns of sibling substance use (using latent class analysis).
  - **H1:** I expect a three-class model of sibling substance use patterns will be the best measurement strategy for analyzing patterns of sibling substance use. Specifically, I expect to find support for (a) a class with siblings similar in high substance use, (b) a class with siblings similar in low substance use, and (c) a class with siblings altogether different in their substance use.

- **Aim 2:** Predict patterns of sibling substance use based on previous research (by predicting patterns based on sibling gender, age, genetic similarity), as well as extending it (by predicting patterns based on sibling and parent relationship quality, both self-reported and observed, as well as self-reported sharing of friends, and negative life events).
  - **H2.** Replicating previous research, I expect that sibling similarity in substance use will be predicted by sibling gender composition (same-gender > similarity), sibling age difference (close in age > similarity), and sibling genetic relatedness (genetically related > similarity).
  - **H3.** I expect that sibling relationship quality (more so than parent-child) will be associated with sibling substance use patterns such that greater communication and intimacy > similarity, and that greater conflict and rivalry > difference in sibling substance use patterns.
  - **H4.** I expect that siblings sharing the same friends will have greater similarity in substance use.
  - **H5.** I expect that discordant experiences of negative life events will have greater difference in sibling substance use.

- **Aim 3:** Determine if characteristics of sibling and parent relationship quality, and reports of negative life events explain a significant proportion of the environment (using cholesky decomposition, Burt et al., 2007; Pike et al., 1996).
  - **H6:** The association between relationship quality and adolescent substance use will be explained primarily by the shared environment, more so for sibling relationships than parent-child relationships.
  - **H7:** The association between negative life events and adolescent substance use will be explained primarily by the nonshared environment.

These determinations can help to define which characteristics of family relationship quality might be more effective to hone in on during adolescent substance use therapy. Therefore, the importance of the proposed research to the family field is that it will lead to better understanding of family contributions to adolescent substance use, which should help to inform therapy and treatment interventions for adolescents with substance use problems. Of course this advancement will come after necessary replication and intervention research.

**Feasibility of research proposal.** By the end of Spring semester, 2011, I will have completed a rough draft of my dissertation proposal that is in the traditional format (intro, methods) as part of the requirement for a class I am
currently enrolled in (FSoS 8047: Integrative). I will have a good foundation to build my dissertation because of the work I will have completed throughout Spring semester. Throughout the summer I will refine my analysis plan, finish my preliminary data analysis (including the missing values and power analyses), and finalize my research strategy. I expect to complete my NIH formatted dissertation proposal, and meet with my committee by the end of August. Therefore I expect to devote the entire academic year to my dissertation.

I will meet my project goals by adhering to the following timeline. **Throughout this timeline, I will be regularly and meeting with my advisor (weekly basis), to seek advice and feedback on my research progress.**

- **September**: I expect to begin analyses surrounding Aim 1, which is to determine the best measurement strategy for measuring sibling substance use patterns. I expect that by the end of September, I will have determined the best strategy (using latent class analyses and analyses of measurement fit).
- **October**: I will write up Aim 1 results and begin analyses surrounding Aim 2, which is to predict sibling substance use patterns based on several control variables (age, gender, genetic similarity) and predictor variables (sibling and parent relationship quality, sibling shared friends, negative life experiences).
- **November**: I will continue to work on Aim 2 analyses and write up results. I will review articles and books on the cholesky decomposition method (method used for Aim 3) and begin Aim 3 analyses.
- **December**: I will have finished the first component of analyses required for Aim 3, which is the basic biometric modeling to determine additive genetic, shared environmental, and nonshared environmental estimates. By the end of December written up the first component of analyses for Aim 3.
- **January**: I will begin central Aim 3 analyses, which is to determine which characteristics of sibling and parent relationship quality contribute to estimates of the shared environment. Using cholesky decomposition, I will begin with characteristics of the sibling relationship and move onto characteristics of the parent-child relationship.
- **February**: I will write up Aim 3 results and begin the Discussion component of my dissertation.
- **March**: I will finish the Discussion component of my dissertation, review and edit the entire work, and submit it to my committee for review.
- **April**: My committee members will read and suggest revisions to my dissertation.
- **May**: I expect to schedule my final defense.

**The potential contribution of these awards would aid the degree to which I could complete my PhD by Spring, 2012.** This would allow me to complete the PhD program within a 3-year time period. Without these awards, this timeline will be significantly extended (expectation of 6 additional months) due to meeting assistantship workloads.

Finally, I believe I am a good candidate for these awards due to progress that I am making towards achieving my overall **career goals and professional promise.** I aim to work towards a tenure track position by balancing both my desire to engage in research, and my desire to share my knowledge with students through teaching and advising. While this application is for funding surrounding my research interests, I am also very passionate about teaching. I have taken GRAD 8101: Teaching in Higher Education which has allowed me to determine my own teaching philosophy, learn about several active learning strategies, and develop a course in which I have an approved application to teach this coming summer (2011) (FSoS 4150: Sibling to Sibling Interactions). Being able to talk with students about research in a way that they can both understand and be academically pushed is really exciting to me, and I am thrilled to teach on a topic that I actively research this coming summer. Finally, my career goals including remaining active in the community through volunteer work. Right now I am a volunteer with the Medical Reserve Corp and have been deployed to administer psychological first aide after extreme devastation cause by flooding (see abbreviated vita for more).

In closing, I want to express my gratitude to the committee for reviewing my application. I believe I am a strong candidate for these awards due to my good student standing, the importance of this research to the family field, my clear and specific timeline, and my overall career goals. Thank you for this opportunity.