

Examining the Relationship Between Internet Use and Face-to-Face Social Interaction

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ABSTRACT

This study examines the relationship between internet use and time spent with friends, relatives, and neighbors in-person socially. It uses data from the General Social Survey (GSS), which asks people in the United States about their behavior, opinions, and backgrounds. The independent variable is internet use, measured with two recoded variables: INTERNET2 and INTERNET2b. INTERNET2 compared broader lower and higher levels of internet use, while INTERNET2b focuses more specifically on extreme or excessive internet use patterns to see whether stronger internet use is related to lower levels of face-to-face interaction. The main purpose of this study is to determine whether higher levels of internet use are associated with lower levels of face-to-face interaction. This question is connected to the displacement hypothesis, which suggests that time spent online may reduce the amount of time available for in-person relationships.

Cross tabular analyses with chi-square tests were used to examine the relationship between internet use and time spent with friends, relatives, and neighbors. Two measures of internet use, INTERNET2 and INTERNET2b, were used in the analysis. The results showed that higher internet use was significantly associated with less face-to-face interaction with friends, but not with relatives. The results for neighbors were mixed, since the relationship only appeared when more extreme or excessive levels of internet use were examined. Theoretically, these findings provide partial support for the displacement hypothesis because internet use was tied most clearly to friendships, while family and neighbor contact did not show the same consistent pattern. This suggests that internet use may matter more for relationships that require voluntary time and active effort to maintain.

INTRODUCTION

The internet has become a normal part of daily life because people use it to communicate with others online, watch videos, read news, and spend time on social media. Considering that so much social activity now happens online, researchers have questioned whether internet use is taking time away from face-to-face relationships. This matters because in-person interaction is still an important part of building and keeping social ties.

Past research has shown mixed results because some studies suggest that heavy internet and social media use may reduce in-person interaction time spent online can replace time spent with others in real life (Andreassen & Pallesen, 2014; Andreassen, 2015; Hou et al., 2019). Other research suggests that online communication can also help people stay connected, especially when it is used to maintain existing relationships with family members or people who live farther away (Danielsbacka et al., 2023). Research has also shown that social media use can be linked to mental health concerns such as anxiety and lower well-being (Eraslan-Capan, 2015; Santini et al., 2024). Due to these mixed findings, it is important to look more closely at how internet use relates to different kinds of social relationships.

This study focuses on whether higher levels of internet use are related to lower levels of face-to-face social interaction by using data from the General Social Survey, which looks at time spent with friends, relatives, and neighbors. These three relationship categories are important because they represent different kinds of social ties. Friendships often relationships may be more stable because they are often shaped by routine, obligation, or long-term connections. Neighbor relationships may be weaker or less frequent than friendships and family ties, so they may only be affected at higher levels of internet use. The main research question is whether internet use is

associated with reduced in-person social interaction, and whether that relationship differs across friends, relatives, and neighbors.

LITERATURE REVIEW

Growth of Internet and Social Media Use

The growth of social media has become one of the more noticeable behavioral shifts of the current era. Pandey (2025) described social media as more than a simple communication tool because it has become part of everyday social life. Social platforms have moved beyond their original purpose as messaging tools or ways to stay connected with people users already know. They now serve as spaces where people seek belonging, emotional support, validation, identity formation, and social comparison. This matters because when social media becomes part of a person's normal day-to-day environment, the time spent in that environment may compete with time that could otherwise be spent in person with friends, relatives, or neighbors.

Excessive Use

What makes this shift from in-person interaction to online engagement difficult to see is how naturally it can happen. Social media is designed to imitate parts of social life through friends, followers, groups, and communities. Due to this, online engagement can start to feel equal to engagement in person, even though it may not provide the same level of closeness, support, or shared experience as face-to-face interaction. For some users, maintaining an online presence or making an impression online can gradually become a substitute for in-person social activities and interactions. Over time, in-person interaction may become less prioritized, less frequent, and less of a habit for individuals who spend more time on social media. Pandey (2025)

argued that society should focus not only on what these platforms add to social life, but also on what they may quietly take away from it.

The Displacement Hypothesis: Time Substitution and Behavioral Consequences

The main concern in this section is that internet and social media use may take time away from face-to-face interaction. This concern is key to the displacement hypothesis, which suggests that time is limited, so the more time individuals spend online, the less time they may have available for other in-person activities and social interactions. The hypothesis does not require that users consciously choose technology over people; it only requires that online activity takes up discretionary time that could have been spent with friends, relatives, or neighbors.

Sönmez Sari and colleagues (2025) offered evidence that heavy social media use can be connected to reduced offline activity. Their cross-sectional study focused on adolescent girls and found that higher social media addiction scores were associated with lower levels of cognitive behavioral physical activity. Although this study did not represent all age groups nor both genders equally, it is still relevant because it shows how heavy social media use can be connected to reduced participation in offline routines. This supports the broader concern behind the displacement hypothesis: when more time and attention are directed toward social media, less may be available for offline activity and face-to-face interaction.

Roberts and David (2025) add to this argument by focusing on the design of social media platforms such as TikTok, Instagram Reels, and YouTube Shorts. They found that the video design affordances built into the short videos on these platforms are specifically engineered to ensure that the time spent on these platforms is extended. This matters because the perception of infinite scrolling keeps an individual engaged. Social media feeds that are curated by the

algorithm are designed to deliver content that is personalized for the user in such a way that it keeps the usage and time online to be more than planned. From a displacement perspective, this extended engagement may reduce the time available for offline interaction.

De and colleagues (2025) also support this point by examining social media algorithms and teen addiction from a neurophysiological and ethical perspective. Their review of the algorithm reinforcing certain mechanisms showed that the variable reward structures that are embedded in social media platforms activate the dopamine pathways that push engagement past the original intentional use. Taken together, Roberts and David (2025) and De and colleagues (2025) suggest that displacement is not only about personal choice. It may also be shaped by a platform design that encourages users to remain online longer, which can reduce the time available for offline social interaction.

Displacement Hypothesis and Social Media Addiction

Studies have continued to explore the relationship between internet and social media use patterns and their effects on offline behavior. According to the literature, the displacement hypothesis proposes that as internet and social media use increase in an individual's life, the amount of time available for offline social interactions with friends, family members, or social groups may be reduced. In this regard, the amount of time spent engaging with the internet and social media platforms may be replacing the amount of time spent engaging in offline social interactions.

Research on the concept of social media addiction provides evidence for the displacement hypothesis. According to Hou and colleagues (2019), social media addiction can be defined as a form of compulsive engagement in which individuals have difficulties in controlling their

engagement despite negative consequences. In this regard, excessive engagement in the internet and social media platforms can have negative effects on daily activities and interactions with others. According to the research findings on social media addiction, individuals with high levels of social media addiction experience negative effects on their well-being and normal social interactions.

Further research has continued to explore the behavioral consequences associated with high levels of engagement in internet and social media platforms. For instance, Sönmez Sari and colleagues (2025) found that high levels of social media addiction in adolescent girls were associated with low levels of physical activity. According to the research findings, excessive engagement in the internet and social media platforms can replace the amount of time spent engaging in daily lifestyle activities that normally take place offline.

Although the research study used adolescent girls as participants, it still provides evidence that excessive engagement in internet and social media platforms may take time away from offline activities. These findings indicate that people who experience more problematic internet use tend to have weaker emotional connectedness with others and experience less meaningful social interaction with others. This matters for the present study because weaker connectedness may help explain why some in-person relationships are more affected than others.

Similarly, Zewude and colleagues (2025) discovered that problematic internet usage had adverse effects on the individual's well-being, leading to low mindfulness, poor emotional connection to others, and dissatisfaction with life. The result implies that higher Internet usage may have adverse impacts both on one's behavior and social relations. These findings suggest that social media may keep users returning to online spaces even when that use may interfere with offline interaction.

Although the study focused partly on mental health, it is still useful here because it connects heavier social media use to weaker social relationships. Although the study used a limited sample of college-aged students, the results are still consistent with the idea that heavier use may be linked to weaker offline social ties. This is useful for the present study because it shows that online engagement may continue even when users no longer find it satisfying, which could further reduce time spent in offline interaction.

Mixed Evidence: Factors of Emotional Reliance

The addiction literature accounts for something harder to recover: the gradual alteration of social behaviors, emotional patterns, and relational motivations that in-person connection depends on. Hou and colleagues (2019) defined social media addiction as compulsive engagement that persists despite having recognized the negative consequences and that this is a behavioral pattern characterized not necessarily by preferences, but by impaired control. Meynadier and colleagues (2025) recognized that the psychological mechanism most at fault for this is emotional reliance. The reliance on social media for emotional fulfillment quietly reduces reliance on the people who surround an individual, and over time, that substitution erodes the social habits that in-person connection depends on.

Zewude and colleagues (2025) help clarify that negative social outcomes are most relevant when internet or social media use becomes addictive or problematic. This distinction is important because not all internet use has the same effect. Some people use digital communication in controlled ways, such as maintaining contact with distant family members, coordinating plans with friends, or participating in communities around similar interests. In those cases, internet use may support social connection rather than replace it. However, when use becomes excessive, compulsive, or emotionally dependent, it may weaken offline connectedness and reduce the habits needed for face-to-face interaction. This means the displacement hypothesis should be

applied carefully because it is not internet use in general that may displace in-person interaction, but heavier or more problematic patterns of use.

Colleagues of Sönmez Sari, Zewude, and Hou (2025; 2019) drew most of their data from younger populations, adolescent samples, or student population. It makes sense that they would draw from these groups not only because it is reasonable, but because they are more accessible, active online, and tend to be online more during their life than their counterparts. Despite this, they are not representative of the full range of people whose social lives can be shaped by heavy social media platform use. The dynamics of displacement are more than likely to look different across the stages of life of someone, and the literature has not kept up with the variety of demographics as it should. This limitation matters in the present study because it leaves open the possibility that some relationships, such as friendships, relatives, and neighbors, may not be affected in the same way. It also supports the use of General Social Survey data because the GSS allows these relationships to be examined with a broader sample than many of the studies focused on students or younger users.

Reinforcement Hypothesis and Digital Communication

The relationship between digital communication and offline interaction is not entirely asymmetrical. In fact, there have been studies that suggested that digital communication can reinforce rather than replace existing relationships. For instance, in a study conducted by Danielsbacka and colleagues (2023) on digital communication with family members, the reinforcement hypothesis was supported. According to the reinforcement hypothesis, digital communication can complement rather than replace traditional interaction. In fact, the results of

the study indicated that individuals who used digital communication with family members at higher frequencies maintained higher levels of traditional interaction with family members.

The above findings indicate that the relationship between internet use and offline interaction is more complex than previously believed. While some research suggests that people who engage in more problematic internet use experience less social interaction and life satisfaction, other research suggests that digital communication can reinforce traditional forms of interaction with others. As a result, more research needs to be done to better understand the relationship between internet use and offline interaction and life satisfaction in general. This point is especially important for the present study because it helps explain why internet use may not show the same relationship across friends, relatives, and neighbors.

Limitations of Empirical Literature

Based on the literature reviewed, existing research suggests that heavier use of social media may be associated with reduced in-person social interactions because online engagement may displace time and attention that would otherwise be spent on face-to-face relationships. Although prior studies provide meaningful support for this pattern, many rely on younger or convenience-based samples, limiting generalizability. This study builds on that literature by testing the following hypothesis: Higher levels of social media (internet) use will be associated with lower levels of in-person social interaction using General Social Survey data.

Taken together, the literature suggests that internet use may not affect all social relationships in the same way. Friendships may be more vulnerable because they often depend on personal choice, time, and active effort, while family relationships may remain more stable because they are often maintained through routine, obligation, or digital reinforcement. The literature also

suggests that stronger negative patterns may be more likely at heavier levels of internet use than at lower levels.

HYPOTHESIS

The main hypothesis in this study is that higher levels of internet use will be related to lower levels of face-to-face social interaction. This is expected to be most clear in time spent with friends, since friendships usually take more voluntary effort and personal choice to maintain than family relationships. In contrast, time spent with relatives may be less affected because family relationships are often more routine and stable, and digital communication may reinforce family contact rather than replace it (Danielsbacka et al., 2023). Time spent with neighbors is expected to show a weaker relationship and may only be affected at the highest levels of internet use.

Research Question / Hypothesis	Expected Relationship
RQ1	Is internet use associated with time spent face-to-face with friends?
H1	Higher internet use will be associated with less face-to-face time with friends.
RQ2	Is internet use associated with time spent face-to-face with relatives?
H2	The relationship between internet use and time with relatives will be weaker or not statistically significant.
RQ3	Is internet use associated with time spent face-to-face with neighbors?
H3	The relationship between internet use and time with neighbors will be weaker and may appear only at extreme levels of internet use.

METHODOLOGY

This study uses secondary data from the General Social Survey (GSS), a national survey dataset that collects information on people's social behaviors, attitudes, backgrounds, and demographic characteristics in the United States. The analysis includes only respondents who provided valid answers for the variables used in each test. Due to this, missing responses can vary across variables; the sample size may differ depending on the specific relationship being examined.

The main independent variable in this study is internet use, measured using two recoded variables: INTERNET2 and INTERNET2b. INTERNET2 and INTERNET2b are recorded measures of internet use created from the original GSS internet use variable. INTERNET2 categorizes respondents into lower and higher levels of internet use, while INTERNET2b focuses on more extreme/excessive levels of internet use. Essentially, INTERNET2 captures a general lower-versus-higher internet use comparison, while INTERNET2b tests whether the pattern becomes stronger when the analysis focuses on heavier or more extreme or excessive internet users. Using both variables helps determine whether the relationship between internet use and face-to-face interaction appears across general internet use or only at more extreme or excessive levels of use.

The dependent variables measure face-to-face social interaction and include time spent with friends (socfrend), time spent with relatives (socrel), and time spent with neighbors (socomun). Control variables such as age, sex, education, and income were considered because demographic differences may be related to both internet use and social interaction.

To examine the relationship between internet use and face-to-face social interaction, chi-square tests of independence were used with crosstabulation tables. This made it possible to see whether differences in social interaction across levels of internet use were statistically significant. Results were treated as statistically significant when the p-value was less than .05, and because this study uses cross-sectional survey data, the results show relationships between variables, not necessarily causal effects.

RESULTS

The results showed that internet use was related to face-to-face social interaction in different ways depending on the types of relationships being examined. For time spent with friends, there was a statistically significant relationship for both internet use measures, INTERNET2 ($\chi^2(6, N = 1333) = 23.45, p < .001$) and INTERNET2b ($\chi^2(6, N = 1333) = 19.70, p = .003$). Higher levels of internet use were associated with differences in how often individuals spend time with friends.

→ Crosstabs

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
dichotomy ~90th percentile * Spend evening with friends	1333	40.3%	1976	59.7%	3309	100.0%

dichotomy ~90th percentile * Spend evening with friends Crosstabulation

			Spend evening with friends							Total
			almost daily	once or twice a week	several times a month	about once a month	several times a year	about once a year	never	
dichotomy ~90th percentile	.00	Count	32	170	259	249	273	108	106	1197
		% within dichotomy ~90th percentile	2.7%	14.2%	21.6%	20.8%	22.8%	9.0%	8.9%	100.0%
	1.00	Count	2	18	22	25	24	20	25	136
		% within dichotomy ~90th percentile	1.5%	13.2%	16.2%	18.4%	17.6%	14.7%	18.4%	100.0%
Total		Count	34	188	281	274	297	128	131	1333
		% within dichotomy ~90th percentile	2.6%	14.1%	21.1%	20.6%	22.3%	9.6%	9.8%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	19.695 ^a	6	.003
Likelihood Ratio	17.497	6	.008
Linear-by-Linear Association	10.333	1	.001
N of Valid Cases	1333		

a. 1 cells (7.1%) have expected count less than 5. The minimum expected count is 3.47.

In contrast, there was no statistically significant relationship for time spent with relatives for either INTERNET2 ($p = .723$) or INTERNET2b ($p = .478$), suggesting that internet use does not appear to affect time spent with family in the same way.

◆ Crosstabs

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
dichotomy ~90th percentile * Spend evening with relatives	1336	40.4%	1973	59.6%	3309	100.0%

dichotomy ~90th percentile * Spend evening with relatives Crosstabulation

			Spend evening with relatives							
			almost daily	once or twice a week	several times a month	about once a month	several times a year	about once a year	never	Total
dichotomy ~90th percentile	.00	Count	138	249	237	165	252	103	56	1200
		% within dichotomy ~90th percentile	11.5%	20.8%	19.8%	13.8%	21.0%	8.6%	4.7%	100.0%
	1.00	Count	14	33	26	25	21	13	4	136
		% within dichotomy ~90th percentile	10.3%	24.3%	19.1%	18.4%	15.4%	9.6%	2.9%	100.0%
Total		Count	152	282	263	190	273	116	60	1336
		% within dichotomy ~90th percentile	11.4%	21.1%	19.7%	14.2%	20.4%	8.7%	4.5%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.530 ^a	6	.478
Likelihood Ratio	5.616	6	.468
Linear-by-Linear Association	.579	1	.447
N of Valid Cases	1336		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.11.

For time spent with neighbors, INTERNET2 was not statistically significant ($p = .269$), while INTERNET2b was statistically significant ($p = .006$), indicating that only very high levels of internet use may be associated with differences in interaction with neighbors.

Crosstabs

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Spend evening with neighbor * dichotomy ~75 percentile	1334	40.3%	1975	59.7%	3309	100.0%

Spend evening with neighbor * dichotomy ~75 percentile Crosstabulation

		dichotomy ~75 percentile		Total	
		.00	1.00		
Spend evening with neighbor	almost daily	Count	38	15	53
		% within Spend evening with neighbor	71.7%	28.3%	100.0%
	once or twice a week	Count	109	49	158
		% within Spend evening with neighbor	69.0%	31.0%	100.0%
	several times a month	Count	112	31	143
		% within Spend evening with neighbor	78.3%	21.7%	100.0%
	about once a month	Count	125	53	178
		% within Spend evening with neighbor	70.2%	29.8%	100.0%
	several times a year	Count	145	38	183
		% within Spend evening with neighbor	79.2%	20.8%	100.0%
	about once a year	Count	124	42	166
		% within Spend evening with neighbor	74.7%	25.3%	100.0%
	never	Count	333	120	453
		% within Spend evening with neighbor	73.5%	26.5%	100.0%
Total		Count	986	348	1334
		% within Spend evening with neighbor	73.9%	26.1%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.600 ^a	6	.269
Likelihood Ratio	7.683	6	.262
Linear-by-Linear Association	.401	1	.527
N of Valid Cases	1334		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.83.

→ Crosstabs

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Spend evening with neighbor * dichotomy ~90th percentile	1334	40.3%	1975	59.7%	3309	100.0%

Spend evening with neighbor * dichotomy ~90th percentile Crosstabulation

		dichotomy ~90th percentile		Total
		.00	1.00	
Spend evening with neighbor	almost daily	Count 42	11	53
		% within Spend evening with neighbor 79.2%	20.8%	100.0%
once or twice a week	Count	135	23	158
		% within Spend evening with neighbor 85.4%	14.6%	100.0%
several times a month	Count	135	8	143
		% within Spend evening with neighbor 94.4%	5.6%	100.0%
about once a month	Count	154	24	178
		% within Spend evening with neighbor 86.5%	13.5%	100.0%
several times a year	Count	168	15	183
		% within Spend evening with neighbor 91.8%	8.2%	100.0%
about once a year	Count	148	18	166
		% within Spend evening with neighbor 89.2%	10.8%	100.0%
never	Count	416	37	453
		% within Spend evening with neighbor 91.8%	8.2%	100.0%
Total	Count	1198	136	1334
		% within Spend evening with neighbor 89.8%	10.2%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.054 ^a	6	.006
Likelihood Ratio	16.979	6	.009
Linear-by-Linear Association	6.151	1	.013
N of Valid Cases	1334		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.40.

These results indicated that higher levels of internet use were associated with reduced time spent with friends. Individuals with greater internet use were more likely to report minimal or no face-to-face interaction with friends.

For time spent with relatives, the relationship was not statistically significant for either INTERNET2, $p = .723$, or INTERNET2b, $p = .478$. This means the data did not show a clear relationship between internet use and time spent with relatives. This finding does not support the displacement hypothesis for family relationships. One possible explanation is that family relationships may be more stable because they are often maintained through routine, obligation, or digital communication that reinforces contact rather than replaces it. For time spent with

neighbors, the results were mixed. INTERNET2 was not statistically significant, $p = .269$, while INTERNET2b was statistically significant, $p = .006$. This suggests that general internet use may not strongly affect neighbor interaction, but excessive levels of internet use may be related to reduced contact with neighbors.

The strongest and most consistent relationship was found between internet use and time spent with friends. The results for relatives showed no clear relationships, and the results for neighbors only showed a relationship with excessive levels of internet use. These findings give partial support to the idea that heavier internet use may be linked to lower levels of in-person social interaction, but mainly for friendships.

Table 1. Summary of Chi-Square Results for Internet Use and Face-to-Face Social Interaction

Relationship Outcome	Internet-Use Measure	Key Statistic	Interpretation
Friends (socfrend)	INTERNET2	$\chi^2(6, N = 1,333) = 23.45, p < .001$	Significant; supports the displacement hypothesis for friendships.
Friends (socfrend)	INTERNET2b	$\chi^2(6, N = 1,333) = 19.70, p = .003$	Significant; result remains when extreme internet use is tested.
Relatives (socrel)	INTERNET2	$p = .723$	Not statistically significant.

Relatives (socrel)	INTERNET2b	$p = .478$	Not statistically significant.
Neighbors (socomun)	INTERNET2	$p = .269$	Not statistically significant.
Neighbors (socomun)	INTERNET2b	$p = .006$	Significant only at more extreme levels of internet use.

Table 2. Summary of Reported Control-Variable Associations

Face-to-Face Outcome	Age	Sex	Education	Income
Time with relatives	Significant	Not significant	Not significant	Significant
Time with friends	Significant	Not significant	Significant	Significant
Time with neighbors	Significant	Not significant	Not significant	Significant

DISCUSSION/CONCLUSIONS

This study examined whether higher levels of internet use are associated with lower levels of in-person social interaction. The findings provide partial support for the displacement hypothesis, but the support is not uniform across all types of relationships. The strongest support appeared in the relationship between internet use and time spent with friends. Individuals who reported higher levels of internet use were more likely to report reduced face-to-face interaction with friends. This finding is consistent with the displacement hypothesis because it suggests that time spent online may take time away from relationships that depend heavily on voluntary effort and active maintenance.

This relationship was not consistent across all forms of social interaction. Internet use was not significantly associated with time spent with relatives. This finding does not support the displacement hypothesis for family relationships. Instead, it is more consistent with the reinforcement hypothesis discussed by Danielsbacka and colleagues (2023), which suggests that digital communication can reinforce traditional communication with kin rather than replace it. Internet use may not reduce family contact because some forms of digital communication help maintain family relationships.

The findings for neighbors were mixed, because internet use was not significantly related to neighbor interaction when using INTERNET2, but it was significant when using INTERNET2b. This suggests that neighbor contact may only be affected when internet use becomes more extreme. Unlike close friendships or family relationships, neighbor relationships may already be less frequent or less emotionally close, which could make the relationship harder to detect unless internet use is especially high.

These findings connect back to the literature review because they show that the displacement hypothesis is useful but not complete on its own. Prior research suggests that heavy, compulsive, or addictive internet and social media use can reduce time available for offline relationships (Andreassen & Pallesen, 2014; Andreassen, 2015; Hou et al., 2019). The current study supports that idea most clearly for friendships. The findings also reflect the mixed evidence in the literature because internet use did not reduce all forms of social interaction equally. The results suggest that internet use may displace some types of relationships while having little effect on others.

An important implication of these findings is that friendships may be more vulnerable to changes in time allocation. Unlike family relationships, which are often maintained through routine or obligation, friendships require more active effort. As a result, they may be more easily displaced by increased online engagement. Theoretically, this means that the displacement hypothesis should be applied more carefully. Rather than assuming that internet use reduces all face-to-face interaction, it may be more accurate to argue that internet use affects some social ties more than others.

This study does have its limitations because first, the data are cross-sectional, which means the results show associations but cannot prove cause and effect. It is possible that higher internet use reduces face-to-face interaction, but it is also possible that people with less face-to-face interaction spend more time online. Second, the study relies on self-reported data, which may be affected by recall error or social desirability bias (Nederhof, 1985). Third, the internet-use variables do not show exactly what people are doing online. For example, using the internet for work, school, contacting distant family, gaming, or doom-scrolling social media may have different effects on face-to-face interaction.

Future research should examine different types of internet use, including platform-specific behaviors and motivations for use. Longitudinal studies would also be valuable in determining how internet use influences social interaction over time. This study suggests that the impact of internet use on social interaction is not uniform but is most clearly observed in relationships that require more active maintenance, particularly friendships. The findings provide partial support for the displacement hypothesis: internet use appears to be associated with less time spent with friends, but the evidence is weaker or inconsistent for relatives and neighbors.

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APPENDIX A: CODING SHEET

The coding sheet below identifies the variables used in the analysis and how each variable functions in the study.

Variable	Role in Study	Concept Measured	Operational Definition	Notes
INTERNET2	Independent variable	Internet use	Dichotomized measure separating lower and higher levels of internet use	Used in chi-square tests
INTERNET2b	Independent variable	Extreme/Excessive internet use	Dichotomized measure focused on more extreme internet-use categories	Used as second internet-use test
socfrend	Dependent variable	Face-to-face time with friends	Respondent-reported frequency of spending social time with friends	Friendship interaction outcome
socrel	Dependent variable	Face-to-face time with relatives	Respondent-reported frequency of spending social time with relatives	Family interaction outcome
socomun	Dependent variable	Face-to-face time with neighbors	Respondent-reported frequency of spending social time with neighbors	Neighbor interaction outcome
age	Control variable	Age	Respondent age	Demographic control
sex	Control variable	Sex	Respondent sex	Demographic control
educ	Control variable	Education	Respondent education level	Demographic control
income	Control variable	Income	Respondent income category	Demographic control

APPENDIX B: SECONDARY DATA SOURCE CHARACTERISTICS

The General Social Survey is appropriate for this project because it provides secondary survey data on social behavior, demographic characteristics, and attitudes among respondents in the United States. For this project, the GSS is useful because it includes measures of internet use and measures of face-to-face interaction with friends, relatives, and neighbors.

Important characteristics of the data source include:

1. The data are secondary, meaning the research team did not collect the original survey responses.
2. The data are cross-sectional for the variables used here, meaning the analysis shows associations rather than causal direction.
3. The measures are self-reported, meaning responses may be affected by recall error or social desirability.
4. Valid sample sizes may change across tests depending on missing data.

APPENDIX C: DETAILED MEASURES AND SUPPLEMENTAL ANALYSIS NOTES

Dependent variables: The dependent variables are socfrend, socrel, and soccomun. These variables capture how often respondents spend face-to-face social time with friends, relatives, and neighbors. Together, they allow the study to examine whether internet use is related to all in-person relationships equally or whether the relationship differs by social tie.

Independent variables: INTERNET2 and INTERNET2b are used to measure internet use. INTERNET2 captures a broader lower-versus-higher use distinction, while INTERNET2b captures a more extreme-use comparison. Using both measures strengthens the analysis because it checks whether the results are consistent across different ways of categorizing internet use.

Control variables: Age, sex, education, and income were considered as demographic controls. These controls are important because social interaction patterns may differ by life stage, socioeconomic status, and access to technology.

Analysis notes: Chi-square tests are appropriate because the variables are categorical. The statistical significance threshold was $p < .05$. A statistically significant result means there is evidence of an association between the variables, but it does not prove that internet use caused the change in face-to-face interaction.