The Effect of Political Socialization on Perception of Party Identification and Expression of Identity Homophily Among High School Students

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ACAS 210 Advanced Methods of Research

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Acknowledgements

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Abstract

Political socialization can be defined as the process by which individuals become politically aware, capable of forming their own political beliefs and identity, and ready to engage in the democratic process. Political socialization research has long examined the agents of socialization that act upon adolescents. This study focuses in on how peer dynamics (agents of socialization themselves) and identity homophily, the tendency to seek out people with political alignments similar to one's own, are affected by political socialization levels. A survey was distributed within selected classes of a New York high school, and student dyads (n=54) self-reported their political identifications and perceived identifications of their partners. After binning and averaging political socialization, perceptual accuracy, and identity homophily, there appeared to be a strong non-linear correlation between socialization and accuracy of party identification perception, but contrary to the hypothesis, not between socialization and homophily. Further research on the factors that affect identity homophily among adolescents and chi-squared tests for independence between the variables will continue to develop on the relationship between these agents of socialization, leading to a greater understanding of how America's youngest generations develop politically.

Introduction

High school years are formative times for most adolescents, as they learn the skills and lessons necessary to function as adult members of society. In the United States, this process includes becoming aware of responsibilities as a citizen, and the citizen's role in the political system. However, this learning process is not as straightforward as a civics class, and runs much deeper

in affecting how a person will live out the rest of their life. Understanding how political socialization takes place is vitally important in our democracy.

Review of Literature

As a subdiscipline, political socialization was first definitively reviewed by Hyman in 1959, who drew together the scattered literature relating to the subject. Political socialization allows individuals to become good citizens, make informed decisions, and develop political opinions of their own, a process especially important in the United States, where voters determine how the government acts. There are five main agents of political socialization, including voluntary associations, parents, schools, media, and peer interactions. Parents who discuss politics with their children more frequently lead those children to be more likely to engage in politics later in life. Schools can influence the political participation of their pupils: through how they teach and what they teach. Consumption of news media makes people more likely to engage in politics, while general internet and television use will be associated with less political participation. Peers are also a factor, as through discussion with peers, adolescents develop their opinions and political skills. Peer and voluntary association, however, appear to have strong positive effects on political socialization (Quintelier, 2015). Research on the transmission of political orientations between parents and offspring overwhelmingly adheres to the "direct transmission" approach, which assumes that concordance of political orientations, as self-reported by both parties, is evidence of direct transmission (Jennings & Neimi, 1968). However, parent-child concordance does not necessarily correspond to accurate transmission. Concordance increases the likelihood a child will want to be like their parent, but does not increase understanding of their parent's views, sometimes resulting in the adoption of a misperceived political identification (Ojeda and Hatemi, 2020). These socialization agents are

highly relevant to the socialization process, as there is a high correlation between the political dispositions of teenagers and socializing agents, particularly their parents, despite the trend towards less parental importance as social media rises as a socializing factor (Green, 2021). One study of Canadian teenagers found that peer influence was on par with parent influence in the case of political interest levels (Dostie-Goulet, 2019), which is why my research focused on peer association. Another phenomenon associated with political socialization is political homophily, or selecting for those exhibiting similar political values when forming relationships. Saeidibonab found in 2017 that among adolescents, political homophily was only robust for individuals who were participating in political meetings. However, due to lack of sufficient data, the relations between network structure and homophilous relations could not be accurately tested for. Adolescents are, as a rule, less likely to participate in political meanings, so less political homophily is expected.

Significance of Research

The relevance of research on the political behavior of youth has been well-established by generational replacement theory, because in a democratic system, the political behavior of today's youth cohort will have a fear-reaching effect on the political climate of tomorrow (Abramson & Inglehart, 2009). While relationships between parents and adolescents, and teachers and adolescents (Hess and Torney, 1967) have been studied, those between adolescents have not been as extensively examined, leading to a research gap that this paper attempts to address. The power balance between two teenagers is very different from that between a teenager and an adult, and therefore, research specifically on the socialization patterns between adolescent peers is necessary to glean new insights about the political socialization process. Thirdly, as social media continues to shift the ways that youth interact politically, so does the body of

research devoted to political socialization, with many recent studies on social media use's effects on the process. However, it is important to devote study to peer relationships as agents of politicization, especially against the rise of social media. Lastly, the abundance of research on political socialization that Hyman's worked ushered in during the second half of the 20th century was conducted in a very different America than the one we live in today. Women, African Americans, and other then-marginalized communities have far more agency today than they did in the 1960s. For these social groups, continued revisitation of political socialization is necessary to illustrate this change of contexts (Sapiro, 2004), and contributing more political socialization research to the canon aids this process, even if it does not specifically focus on those demographics.

Statement of Purpose and Hypotheses

The purpose of my study was twofold:

1. Examine the perception of PID among adolescents, and to identify what factors influence its accuracy.

2. Examine which factors influence exhibition of identity homophily among adolescents.

In constructing this study, I formulated two hypotheses:

If an adolescent exhibits high levels of politicization, then they are more likely to perceive PIDs correctly. This was the case in Ojeda and Hatemi's 2020 research on parent-child dyads, so I wanted to determine if that supported hypothesis could be generalized to peer-peer dyads.

If an adolescent exhibits high levels of politicization, then they are more likely to exhibit identity homophily. Since Saeidibonab in 2017 found identity homophily significant only for adolescents

engaging in political meetings, I decided to compare political homophily to less specialized metrics of political engagement.

Methods and Materials

Research Design and Data Collection

A survey was chosen as the instrument of data collection. The survey was designed in Google Forms, for several reasons. Firstly, many quizzes and assignments are released to high school students in this medium, meaning that the population for this study was already very familiar with the procedure for filling them out. This sense of familiarity and relative ease was intended to encourage all students to participate, to minimize unwanted selection for only students engaged enough to exert significant effort. Secondly, results from the survey were directly linked into Google Sheets, making analysis easier. Thirdly, Forms allowed access to be limited only to school accounts, and set at only one response per person, while keeping the survey anonymous. Since the hypotheses of this research were concerned with perception and socialization between peers, the survey was administered to dyads, a self-selected group of two students who wished to take the survey together. When I administered it to a class, I first explained the procedure, and then offered any interested students slips of paper with dyad numbers written on them. The two students within a dyad were then instructed to choose one to be the "A" and one to be the "B", and then input their dyad number (for example, 12A) at the top of their form. In this way, I could sort for each dyad while maintaining the anonymity of all participants. Before being released to human participants, the survey was reviewed by Schuylerville's IRB to ensure that it followed the guidelines for research involving human subjects. Informed consent was required from all participants above 18, and parental consent

from those under 18. Additionally, all questions (except informed consent) were optional, and I specified before each administration of the survey that participants were welcome to skip any question they did not wish to answer. After administering the survey, I gave my email to all participants if they wished to provide feedback on the experience, or wished to convey that the survey had been emotionally distressing in any way.

Survey Content

The questionnaire consisted of four parts. Firstly, an assurance of anonymity, and a few questions establishing informed consent, as well as demographic questions. Secondly, the participant was asked a set of questions designed to gauge their own individual political identification, followed by a series of similar questions regarding their *perception* of the other participant's PID. As Hyman stated in 1959, the "adult pattern that seems established in most complete form in earlier life is that of *party affiliation*" (p. 46, Hyman's italics). Questions regarding PID were taken from the National Longitudinal Study of Youth, Round 23, and were designed to force participants into choosing between a Republican/Democratic party dichotomy. Lastly, they filled out a short political knowledge section, seven multiple-choice questions ranging in difficulty, including "Who is President of the United States?" and "Who is Speaker of the House?"

Survey Distribution

The survey was administered to classes throughout Schuylerville Central High School, New York. Classes were distributed across grade levels and subjects, in order to gather a sample size that generally matched the demographic profile of the school. Teachers were provided with a short script and FAQ sheet with which to administer the survey, but they were not told the

research premise or hypotheses beforehand, legitimizing the administration of the survey by adding a double-blind element.

Limitations

Since the survey was only released within one school, the demographic of the sample is only representative of Schuylerville's high school population, which is 94% white, and only 30% of students are economically disadvantaged (NYSED, 2023). This is not representative of the United States as a whole, meaning that my results cannot be accurately generalized to the broader population. The majority of respondents were 11th or 12th graders, and the relationships represented within the dyads skewed long (fig. 1), as one would expect within a school as small as Schuylerville (a total of 409 students enrolled in the high school, as of 2022), meaning accurate data on homophily within newly initiated friendships was virtually nonexistent. Voluntary participation in the survey most likely unintentionally filtered for students already more politically engaged than their peers, since they were willing to spend a few minutes' worth of effort on the survey.

Figure 1

Distribution of friendship length within the participating dyads.
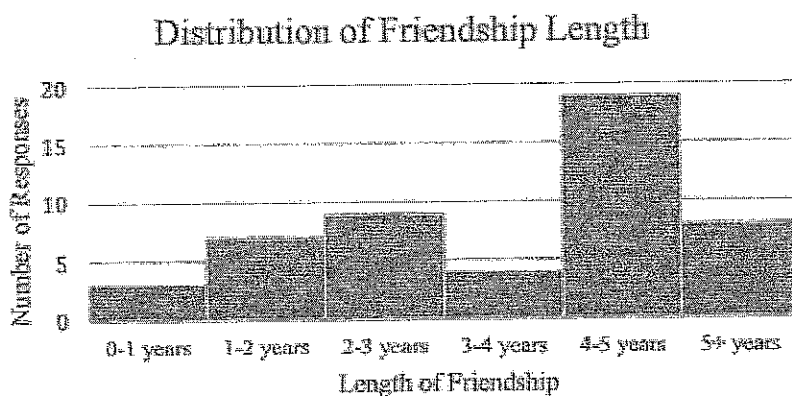
Results

Data was exported from Google Sheets and analyzed in Excel. Several variables were sub-scores, calculated based on data collected.

Politicization score (poliscore): this functioned as a metric to assess how politically socialized the students were already. A few different components went into the final poliscore, namely the engagement component, the knowledge component, and the awareness component. Engagement component: participants were asked to tally the number of political actions they had taken in the past year. They were offered a list of common actions as possibilities, but also invited to write in actions not listed; for example, participant 1A wrote in "Attended public comment at a school board meeting", which was deemed a legitimate action and given a score of 1 on their tally. Answers, though technically infinite in potential, ranged from 0 to 5. Knowledge component: total number of questions answered correctly in the informational section. Although the possible point range was 0 to 7, scores ranged mostly from 1 to 6 (only one individual scored the full 7 points), due to the varying difficulty of the questions. Awareness component: the question on how often a participant consumed political news was evaluated on a five-point Likert scale.

I calculated the final poliscore by adding the deviation of a participant's engagement and knowledge score from their grade's average to their awareness score. There are multiple layers of reasoning for this decision. It is unreasonable to expect a tenth grader to exhibit the same political engagement and knowledge as a twelfth grader, since they are further from voting age, and less likely to be active in the political sphere. Knowledge also differs from grade to grade, as significant deviations in average political knowledge between high school grade levels have been observed (Vasquez, 2019). Averaging and calculating deviation controlled for that factor in the

poliscore. Then, their score on the awareness component, valued from 1 to 5, was added.

Therefore, awareness was weighted more heavily, as news sources have a greater effect on

political socialization (Litt, 1963; Green, 2021). Political news is also easily accessible to all

high schoolers, regardless of grade level, thanks to the prevalence of school-provided digital

devices, so the awareness score did not require averaging.

Accuracy of perception: using a custom scale (Table 1), the accuracy of each perception was

calculated by assigning it a value between 1 and 9.

Table 1

9	Correct alignment exactly
8	Correct party alignment, but incorrect strength qualifier
7	Incorrectly perceived as an independent, but correct party qualifier IF other participant chose weak party qualifier OR Incorrectly perceived as party-aligned, weak strength qualifier and correct party
6	Incorrectly perceived as party-aligned, strong strength qualifier and correct party, OR incorrectly perceived as independent, correct party qualifier, IF other participant chose strong strength qualifier
5	Correctly perceived as an independent, incorrect party qualifier
4	Incorrectly perceived as party-aligned, weak strength qualifier and incorrect party, OR incorrectly perceived as independent, incorrect party qualifier IF other participant chose weak strength qualifier
3	Incorrectly perceived as party-aligned, strong strength qualifier and incorrect party, OR incorrectly perceived as independent, incorrect party qualifier IF other participant chose strong strength qualifier
2	Incorrect party, correct weak strength qualifier
1.5	Incorrect party, incorrect strength qualifier
1	Incorrect party, correct strong strength qualifier

Exhibition of homophily: a similar scale (Table 2) was used to calculate the degree of distance between an individual's self-reported PID, and the PID they perceived the other participant as having. No homophily between the actual PIDs within a dyad were calculated, because when evaluating homophily, only the perceived difference between orientations is relevant to each individual.

Table 2

9	Same alignment exactly
8	Same party alignment, but different strength qualifiers
7	Independent, same party qualifier, IF other participant was assigned weak party qualifier
6	Independent, same party qualifier, IF other participant was assigned strong strength qualifier
5	Both independent, different party qualifiers
4	Party-aligned, weak strength qualifier, IF other participant was assigned independent and different party qualifier
3	Party-aligned, strong strength qualifier, IF other participant was assigned independent and different party qualifier
2	Different parties, weak strength qualifiers
1.5	Different parties, different strength qualifiers
1	Different parties, strong strength qualifiers

Perception of PID

An initial graph of poliscore versus accuracy of perception of party identification showed a definite trend towards correlation, without a clear line of best fit, as seen in fig. 2. This, however, was to be expected. At all levels of politicization, there was the possibility that a participant could correctly guess the PID of their dyad partner, as evidenced by consistent perfect scores of nine across the range of poliscores. As the poliscore values increased, however, it appeared to have a negative correlation with inaccurate perceptions.

Figure 2

Accuracy of PID perception versus political knowledge, engagement, and awareness score.
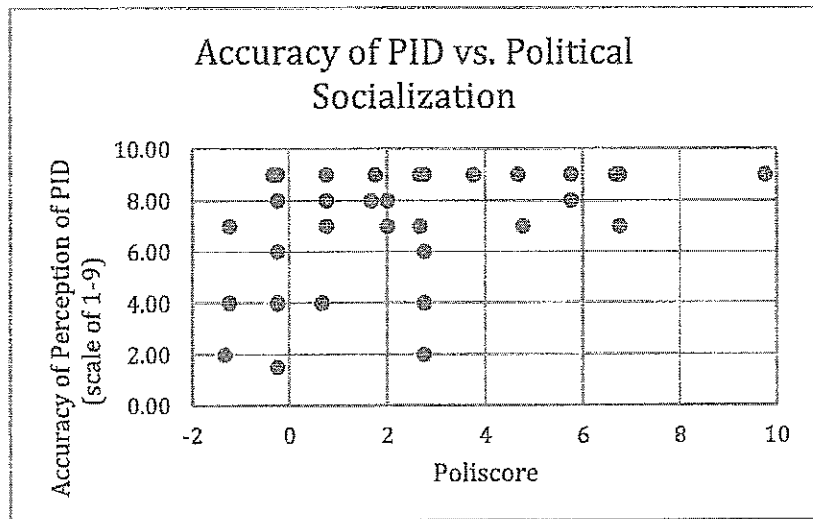
The next statistical method applied to the data was a multi-step process. First, I binned the data by poliscore, and calculated a standard deviation for each bin. Next, I averaged the accuracy of perception scores within each bin. When I graphed the average accuracies versus the bin values, a high correlation was visible, as seen in fig. 3.

Figure 3

Averaged poliscore versus binned political knowledge, engagement, and awareness score.
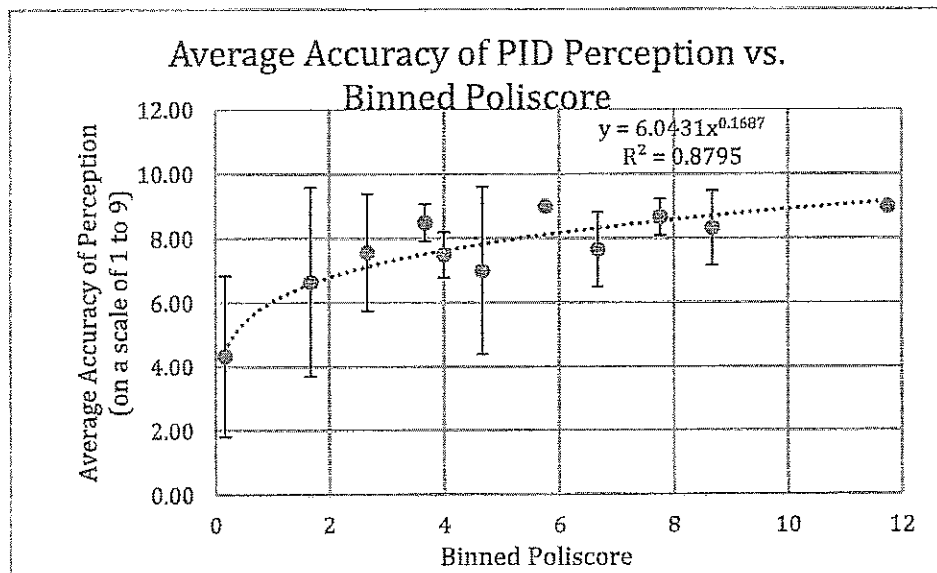
Standard deviation error bars for both the binned poliscore and averaged accuracy were applied.

Poliscores were also adjusted by 1.5 to accommodate the line of best fit.

Expression of Political Homophily

Homophily showed less correlation with the poliscore in both of my analysis methods.

Graphed against the poliscore without embellishment, there appears to be no trend or correlation

between the two variables (fig. 4).

Figure 4

Calculated political homophily versus political knowledge, engagement, and awareness score.

Using the binning and averaging method did not yield better results, as there still appears to be

no positive or negative correlation, as seen in fig. 5.

Figure 5

Average political homophily vs. binned political knowledge, engagement, and awareness score.

As with fig. 3, standard deviation error bars for both the binned poliscore and averaged homophily were applied, and poliscores were also adjusted by 1.5 to accommodate the line of best fit. Bin values, averages, and standard deviations are listed in Table 3 below.
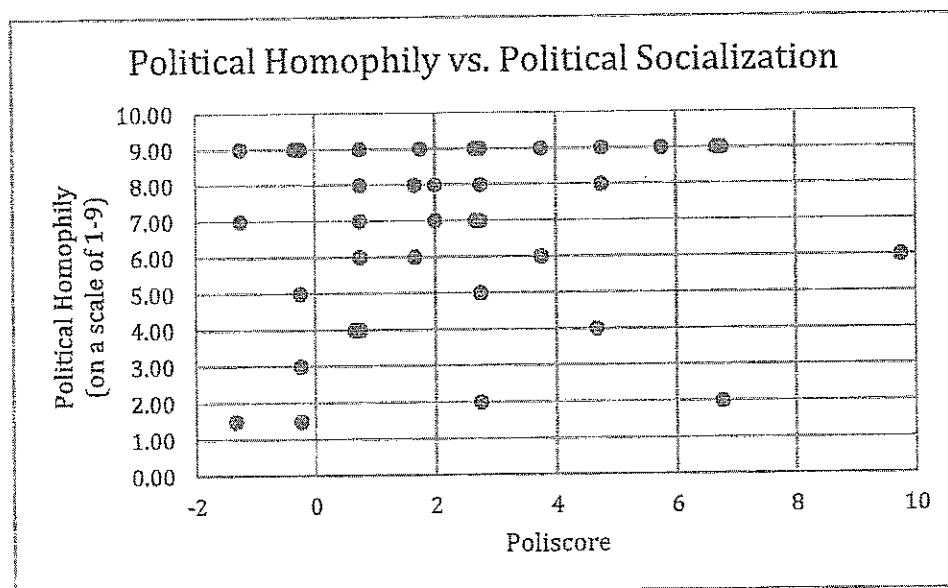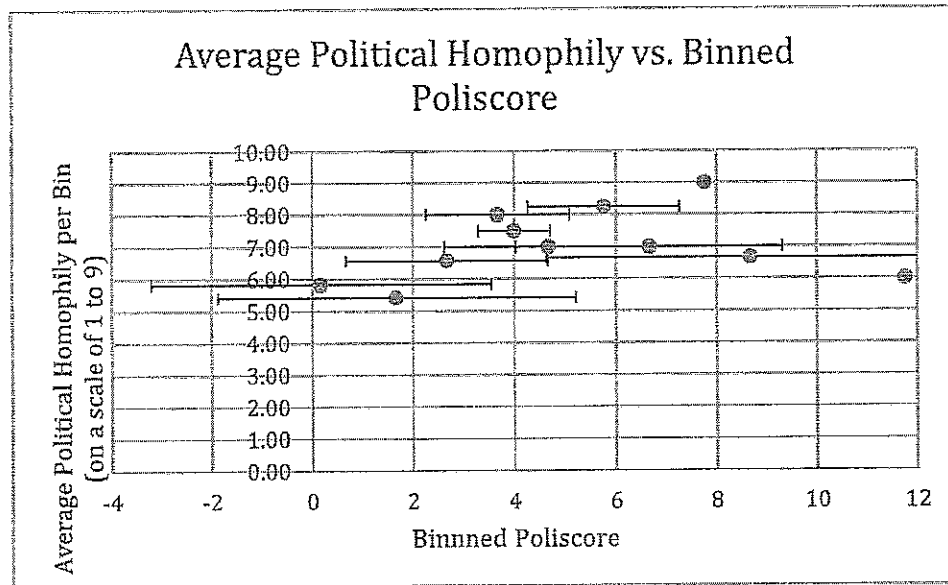
Table 3

poliscore bin value	adjusted bin value (n+1.5)	stdev. poliscore	avg. accuracy PID perception	stdev. accuracy PID perception	avg. Hom	stdev. Hom
-1.33	0.17	0.052	4.333	2.517	5.833	3.383
-0.33	1.67	0.034	6.643	2.954	5.429	3.541
0.67	2.67	0.034	7.571	1.813	6.571	1.988
1.67	3.67	0.049	8.500	0.577	8.000	1.414
2	4	0.000	7.500	0.707	7.500	0.707
2.67	4.67	0.045	7.000	2.608	7.000	2.049
3.76	5.76	0.000	9.000	0.000	8.250	1.500
4.67	6.67	0.052	7.667	1.155	7.000	2.646
5.76	7.76	0.000	8.667	0.577	9.000	0.000
6.67	8.67	0.052	8.333	1.155	6.667	4.041
9.76	11.76	0.000	9.000	0.000	6.000	0.000

Discussion

The data gathered did support my first hypothesis, but did not support my second. The non-linear regression of the graph of accuracy of perception of PID versus the adjusted poliscores had an exponential curve leveling out as adjusted poliscore increased. The goodness of fit is high, with an R-squared value of 0.88, well within the range of acceptable values for social sciences research (Ozili, 2022). This suggests that there is a threshold of political socialization after which it is highly likely that an individual will correctly perceive PID, rather than a continuously increasing correlation between the two. As for the political homophily analysis, the standard deviation is much greater for the homophily data than it was for the accuracy of perception data within each bin, suggesting that the calculated political socialization was not a good indicator of political homophily. There are multiple possible explanations for this. Firstly, the overabundance of old friendships as opposed to newer ones, as shown in fig. 1, means that most friendships within the data were formed before the participants were politically socialized enough to sort for political homophily. It is likely that those friendships were maintained even after both individuals became more politically socialized. Only if political opinions were so different that both individuals ended their friendship over them would lack of concordance affect a relationship, and since the average answer on the question "how often do you discuss political events with [other participant]?" was about halfway between "once a month or less" and "once every two weeks", (n=1.41 out of a Likert scale of 1-5), there wasn't much political communication going on between dyads in the survey sample. Therefore, continued testing of this hypothesis, once enough data is collected to control for heightened political communication within the dyad, may yet provide evidence to support it, but within my sample, there was not enough correlation to do so.

Conclusion

The data supporting my first hypothesis reinforces Ojeda and Hatemi's findings in 2021 that heightened political socialization increases perceptual accuracy, but successfully provides evidence to support this amongst peer dyads consisting of two adolescents as well as parent-child dyads. The lack of concordance between higher-socialized participants can also be interpreted as supporting another one of Ojeda and Hatemi's findings, that increased political socialization does not motivate youths to adopt the PIDs of those around them. If it did, the correlation between poliscore and homophily would likely have been higher due to adolescents choosing to adopt the PIDs of their peers. Since this was not the case, it's likely that this lack of motivation is consistent within adolescent dyads as well. Future research should seek to establish independence between the variables evaluated in this study, most likely using chi-squared tests. The binning and averaging method used to analyze data in this study shows promise for use in other contexts, as well, especially when testing for the accuracy of the perception-adoption approach. Recreating the parent-child dyad results of Ojeda and Hatemi in 2019 using this method and newly collected data would be a relevant application, as the results using this method could be compared to the results they found using multivariate regressions. Data collection for this study is not yet complete, and surveying of Schuylerville High School is ongoing. In the future, the effect of more dyads and, hopefully, a more varied demographic within my sample will yield results that can more easily be generalized to the greater high school population. In doing so, I can recreate the adolescent-focused research of the mid-20th century, contributing to a new wave of political socialization research for a new generation.

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Appendix A: Questionnaire

Thank you for your assistance!
* Indicates required question
If you are over 18, do you consent to the collection of anonymous data in this survey?
Yes
I am under 18 (if so, continue to the next question)
If you are under 18: please have your parent or guardian give consent for the collection of anonymous data in this survey.
The parent/guardian of this participant gives consent.
I am over 18, and have already given consent.
Please list your dyad number in number, letter order (example: 12A)

Untitled Section
these first questions are about YOU, not the other participant. If a question is about the *other participant,* it will specify. Do not confer with your dyad partner while the survey is being administered!
What is your age?
13
14
15
16
17
18

What grade are you currently in?
9th
10th
11th
12th

What politically involved actions have you taken in the past year? Check all that apply, and add up the total number.

-attended a rally
-attended a protest
-posted on social media about political topics
-voted
-below voting age, but plan to vote
-encouraged someone else to vote
-volunteered for a candidate
-action(s) not listed (if so, please specify in the short answer question below)
(Optional short answer question for options not listed above)

Generally speaking, you usually think of *yourself* as a(n)
Republican
Democrat
Independent
Other:

[   ]

If you answered Republican or Democrat, how strong would you qualify that alignment? (skip question if you answered independent)
Strong
Not very strong
If you answered Independent, do you generally think of yourself as closer to the Republican or Democratic Party?

Republican Party
Democratic Party
How often do you look at news about political events, in your own estimation?
1. very rarely (once a month or less)
2. sometimes (once every two weeks)
3. often (once a week)
4. frequently (Every 2-3 days)
5. All the time (Every day)

Generally speaking, you usually think of your parent(s)/guardian(s) as...
Republican
Democrat
Independent/conflicting affiliations
Other:

[   ]

Now we will shift to questions focusing on you and the person you're taking the survey with.
How long have you been friends with [other participant]? (This is the one question on which you can confer with your dyad partner, just to ensure that one consistent answer is chosen between your responses.)
1. Less than one year
2. Between one and two years
3. Between two and three years
4. Between three and four years
5. Between four and five years
6. Over five years

How often do you discuss political issues, in-person or online, with (other participant)?
1. very rarely (once a month or less)
2. sometimes(once every two weeks)
3. often (once a week)
4. frequently (Every 2-3 days)
5. All the time (Every day)

How often do you disagree with (other participants) about political issues?
1. very rarely (once a month or less)
2. sometimes (once every two weeks)
3. often (once a week)
4. frequently (Every 2-3 days)
5. All the time (Every day)

These next few questions are about the *other participant.*

Generally speaking, you usually think of (other participant) as a(n)...

Republican
Democrat
Independent
Other:

If you answered Republican or Democrat, how strong would you qualify that alignment for them?
Strong
Not very strong
If you answered Independent, do you generally think of them as closer to the Republican or Democratic Party?
Democratic Party
Republican Party

Generally speaking, how often do you trust the *factual* accuracy of political statements made by (other participant)?
1. very rarely
2. sometimes
3. often
4. frequently
5. all the time

These questions are not a test-- they're simply to gain a broad understanding of political knowledge at the high school level. Please answer these to the best of your ability, *without* looking up outside information! Any attempts to use outside sources will skew the data collected, and you wouldn't want to do that to me, do you?

Who is the current Governor of New York State? *
Mario Cuomo
Kathy Hochul
Eric Adams
Hakeem Jeffries

Who is president of the United States? *
Eric Adams
Joseph Biden
Kamala Harris
Donald Trump

Who is Speaker of the House? *
Kevin McCarthy
Mike Johnson
Hakeem Jeffries
Ron DeSantis

Who are New York's US Senators? (select two) *
Kirsten Gillibrand
Elise Stefanik
Chuck Schumer
Mario Cuomo

Who is majority leader in the Senate? *
Bernie Sanders
Elise Stefanik
Chuck Schumer
Mitch McConnell

Who is third in line for the presidency, after the Vice President? *
Speaker of the House
Secretary of Defense
the Majority Leader
Majority Whip

How many members are there in the US House of Representatives? *
50
100
435
450

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Please type "N/A" in any field that is "not applicable" to your research.

Projects conducted without proper supervision will be disqualified from both regional and National competition. Further guidelines may be found at http://www.jshs.org & in the Core of Rules of Competition.

Student Participant to Complete:

Name: Eleanor Hughes

Title of Paper: The Effect of Political Socialization on Perception of Party Identification and Party Identification and Expression of Identity Homophily Among High School Students

School: Schuylerville High School

Teacher or Mentor Name: David Conneally

Regional Symposium: New York-Upstate

1. **Please explain your role in the development of the project idea.**
   I have been almost entirely responsible for the development of my project, having read and summarized dozens of articles before honing in on political socialization as my preferred topic for original research.

2. **What steps led you to formulate your research question?**
   – or – What steps led you to develop the design for your project?
   I read pre-existing research, emailed authors of papers I found intriguing, and asked questions about how they chose their topics, and research gaps in existing literature. I also read many older papers from the early years of political socialization research, which is why I wanted my research question to revisit long-standing agents of socialization, instead of newer ones like social media. Knowing this, I formulated a research question based on those resources.

3. **Where did you conduct the major part of your work? If an institutional setting, list the name.**
   (e.g., home, school, or other institutional setting such as university lab, medical center, etc.)
   The major part of my work was conducted in school, as the population for my research was high school students. It was not conducted in an institutional setting.

4. **Describe the assistance that you received throughout the project.**
   I received assistance on the experimental design. My mentor referred me to question databases like the National Longitudinal Survey of Youth from which I could take inspiration when designing my survey questions. My teacher helped me choose which methods to use for data analysis. All other aspects of the project were self-driven and done entirely by me.

5. **If you conducted your research in an institutional setting (i.e., university lab, medical center, etc.), describe your role on the team AND what role each person played in the research investigation?**
   N/A

6. **Describe what parts of the research you did on your own and what parts where you received help.** *(e.g., literature search, hypothesis, experimental design, use of special equipment, gathering data, evaluation of data, statistical analysis, conclusions, and preparation of written report (abstract and/or paper))*

The literature search hypothesis construction, gathering and evaluation of data, statistical analysis, conclusions, and preparation of the written report were all completed entirely by me. My mentor helped me during the experimental design stage, when he looked over the survey I created and confirmed that it would work for my research. My course teacher helped me release the survey.

7. **Was any data set from an outside source (literature, handbooks, publicly available or privately shared tables, etc.) used in the research? If so, what data set(s) was used and from where was it sourced? What was its purpose in this research?**

N/A

8. **Was the data set sourced outside this research the only way to obtain the data required for the research? Please explain.**

N/A

9. Is this research a continuation of an investigation that was previously submitted to a regional JSHS? If so, describe how you have expanded your investigation.

N/A

10. If this is a continuation project, please submit your previously submitted abstract here (copy/paste).

N/A

11. **Did you utilize any form of AI in your research or paper? If so, explain what tools were used AND for what purpose.**

N/A

12. **Is there an IRB determination on file for this research? (Yes/No)**

Yes

13. **Provide the IRB determination details including IRB number, name, institution, and dates.**

Human Participants Form (4), Schuylerville IRB, completed May 9th, 2023

14. **Provide full details about the processes and procedures utilized for your research, including usage & disposal of materials.**

The instrument used for data collection was a survey, which was administered via Google Forms. It followed the guidelines for research on human subjects, requiring informed consent from participants age 18 and up, and parental consent from participants under 18. The survey was administered to willing dyads during the school day, in selected classes with varying ratios of students by grade level.

The data gathered was anonymous, and participants were identified only by their randomly assigned dyad number.

Data was analyzed using original rubrics, and non-linear regression.

Teacher and/or Supervising Mentor to Complete (or Parent if no teacher/mentor involvement):

Comments by teacher and/or supervising mentor on the students' individual contributions to the research investigation or engineering/computer science project. *If no Teacher or Mentor/Scientist was involved the Parent must complete this section describing their role in the research.*

Eleanors Hughes designed and conducted her research with very minimal assistance from her mentor.

Statement by the teacher and/or supervising mentor acknowledging that the student conducted the research in accordance with proper procedures and protocols for the conduct of animal research or human research.

Eleanor Hughes conducted her research in accordance with all of the proper procedures and protocols.

The Student, Teacher and/or Supervising Mentor must sign below. *If you did the work without a teacher or supervising scientist, you will need a signature from your parent and a brief description of their role in the research.*

12/11/2023	*Eleanor Hughes*	Schuylerville High School
Date	Signature of Student (required)	Student's High School

12/11/2023	*[signature]*	Schuylerville High School
Date	Signature of Teacher	Teacher's High School

12/11/2023	*[signature]*	*David Connally*
Date	Signature of Supervising Mentor	Name of Supervising Mentor

	Title of Supervising Mentor	Institution of Supervising Mentor

Date	Signature of Parent (required if no Teacher or Supervising Mentor was involved in the research.)	Name and Phone Number of Parent