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Facial Familiarity as a Function of Age in a Religious Organization

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Acknowledgments

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Abstract

This study examined whether people recognize faces based on age. Participants included 88 people aged 11 and up from a local church. It was hypothesized that participants would be more likely to correctly identify people in their own age group as being a member (or not being a member) of their church than they would correctly identify from any other age group. The hypothesis was supported by research done in previous studies. Participants in 5 age groups were asked to sort the stimuli, a pile of cards with photographs on them, into 2 categories based on recognition. A' was calculated for each participant.

Familiarity of Faces as a Function of Age in Religious Organizations

Picture yourself in this situation: You walk into church and you see one of your friends. You express some sort of greeting to her and she replies with equal enthusiasm. You sit down in your regular pew and at the other end is an older gentleman who you have never seen there before. You turn to ask the person next to you for this information and they reply, "Oh, that's Mr. Smith, he's been coming to this church every Sunday for years." This puzzles you because you could have sworn that you have never once seen Mr. Smith, even though, you, too, regularly attend.

Even if you never attend church, you almost certainly have been in a similar situation at some point in life. It could be someone who you can assure yourself that you have never met, but comes up to you to talk like the two of you are old friends. Or it could be that glimpse or curious recognition between seeming strangers. Why is it that you recognize some people immediately, while others may have been present in a common environment for significant amounts of time and gone unnoticed?

Facial recognition has been studied from several psychological points of view. Shearer and Mikulka (1996) examined facial familiarity from a biological point of view by measuring electrodermal activity (EDA) responses. The participants were broken into two groups and asked to relax in a recliner for about 10 minutes before the experiment would start. The experimental group rated faces according to how familiar they appeared. The control group rated faces according to levels of attractiveness. Both groups gave responses verbally, but they also were measured for arousal level by means of the EDA. Shearer and Mikulka (1996) found that the experimental group had greater EDA responses than did the control group. The task of recognizing a person elicited a greater EDA response than did the task of rating attractiveness (Shearer & Mikulka, 1996). Perhaps when a person is asked to take on a task such as in this experiment, the difficulty of the task provides the elevated EDA. However, it also seems reasonable to conclude

from the data that when an individual sees someone who looks familiar, there is a not only a psychological response, but also a physiological reaction.

Since it may be the case that humans have physical reactions when recognizing a familiar face, it is important to investigate why the faces reserve a spot in memory to start with. Graziano, Smith, Tassinary, Sun, and Pilkington (1996) utilized four separate studies to see if imitation had an effect on remembering faces. Three of the four studies asked one group to imitate the facial expressions of the subject that they were supposed to recall. The first group participants were also told that imitation such as this would improve their recollection of the faces. The other group in each study was simply asked to concentrate on the face they were presented. Participants were unknowingly video taped, as they viewed the stimuli (Graziano et. al, 1996). In the fourth study, electromyographic (EMG) activity was used to evaluate motor responses that resulted from specific areas of the participant's face and upper torso as it was exposed to the stimuli (different faces) for the first time (Graziano et. al, 1996).

Participants were asked to recall the faces presented in different ways, depending upon what study they were a part of. In the first study, both the control and experimental groups were presented with 75 different faces presented on a video tape, there were two different sets of order for the presentation of the faces (Graziano et. al, 1996). The order which each participant viewed was determined randomly, and each stimulus was presented for four seconds. Right after that, the tape was forwarded to a spot where one-hundred-and-forty faces were shown to the participant-- again, for four seconds each. The faces were numbered and the participant placed a check-mark on a form next to the corresponding number if s/he recognized the face (Graziano et. al, 1996). The only difference in methodology from the first study to the second was that a time interval was inserted before recall. In the third study, several additional factors were added, the main one being level of clarity/blurring of the recognition stimuli. The experimenters thought that people who were imitating faces would be more likely to recognized the blurry faces

than those who were simply concentrating on the incoming stimuli. They asked their participants to view stimuli and produce answers in the same manner as studies one and two (Graziano et. al, 1996). The fourth study included the same instructions as the previous three. This study had two phases to the incoming part of the experiment. The first phase, labeled the training phase, showed 38 faces for four seconds each. There was a one second fade to black between faces. The participants were instructed to remember the faces according to the method of their particular condition (imitating or concentrating). The second phase, the recognition phase, included 76 faces presented in the same manner as the stimuli in the training phase were. The new set of faces included the previous 38. The participants were asked to circle a Y or N for each face presented in response to whether or not the particular face was a part of the original set (Graziano et. al, 1996).

The individual and compiled results of the four studies (with the exception of study number two, which showed that there was no evidence that the imitation group recognized faces more accurately than the concentration group) indicated that there was evidence of a negative correlation between facial recognition and spontaneous imitation of faces. The concentration groups all performed equally or better than the imitation groups on facial recognition tasks. In other words, facial imitation hindered recognition (Graziano et. al, 1996).

Regardless of how people interact with the same and opposite sexes, the dynamics of an interaction group are bound to vary. People may act one way in a one on one scenario while acting completely different in a big group. Zarbatany and Pepper (1996) looked at how people enter into new peer groups. They paired second and third grade students to examine this issue. They found that the gender make-up of the dyad did indeed influence how the new group member was treated (1996).

Another relevant issue to recognizing faces of people is generational interaction. In a study by Overbey and Pollina (1996), generational differences between daughters,

mothers, and maternal grandmothers were evaluated. They looked at how different components of responsibility were viewed by all three generations. The largest difference occurred in the category of parental protection of family values (Overbey & Pollina, 1996). Aronson, Mortimer, Zierman, and Hacker (1996) also took interest in exploring the social interaction of different age groups. They reviewed how generational differences governed early work experiences. More specifically, they evaluated how adolescents contribute to family life by means of such things as chores, monetary contributions, etc. The evaluation also extended into the work force where the emphasis was more on parental views of participation and interaction among colleagues of different ages and gender (Aronson et al, 1996).

Due to interaction with people of various ages, both within and outside of the family, one might conclude that individuals become accustomed to recognizing people outside of their immediate age group. However, a study about perceptions of different generations may lead people to deduce otherwise. Slotterback (1996) had young adults rate a target generation in terms of how the generation must have been or will become when they reach a particular age period. The young adults tended to categorize personality characteristics of other age groups as very different than their own, even when regarding the older age groups as young adults (Slotterback, 1996). This kind of stereotype formation may inhibit young adults from viewing middle-aged and older adults as individuals. Thus, stripped of their individuality, other age groups may tend to be less identifiable than one's own category. Since other age groups are seen so differently by young adults, it may also make them less interested in interacting with and noticing the other age groups.

Based on previous research about face recognition and generational interaction, it seems fairly reasonable to deduce that there may be a connection between facial recognition and age cohorts. This would could be studied in a group that consists of a diversely populated age range. A church congregation would naturally be an ideal place

to test such a theory. Churches attract different types of people who are at various stages of their lives. It is hypothesized that individuals within a certain age group will identify faces of their age-related peers as going or not going to their church more accurately than they will identify church attendees of other age groups.

Method

Participants

Participants included 88 members of First United Methodist Church in Williamsport, Pennsylvania, with approximately 600 members from Williamsport and the surrounding communities. Participants were asked to volunteer to participate via a letter (Appendix A) sent to homes of the congregation members. Participants were also asked if they would be a part of the study before or after church, during their meeting times for Sunday school classes, and at other church-related activities. The participants were grouped and classified according to five age groups: middle school (grades 6-8), high school (grades 9-12), young adult (non-high school, ages 18-35), middle adult (ages 36-55), and older adult (56 and older). There were a total of 40 males and 48 females participating. As related to age cohort, there were: 3 males and 5 females in the middle school group, 8 males and 12 females in the high school group, 9 males and 11 females in the young adult group, and 10 males and 10 females in both the middle and older adult groups. The sample of participants consisted mostly of middle-class church attendees.

Apparatus

A 1995 photographic directory from the participants' church was used in conjunction with a 1995 photographic directory from another area church to create the stimuli for the experiment. Faces of corresponding ages to the participants' ages were cut from the directory and then pasted onto halves of note cards. There were 100 stimuli in all-- 50 faces from each church. Numbers were assigned to the backs of cards and the corresponding name was recorded on a separate sheet. For quick analysis at the time of

running participants, odd numbers were assigned to the stimuli from First Church and even numbers were assigned to the stimuli from the outside church.

Procedure

Individuals volunteered to participate and either made an appointment or participated immediately. They were seated with the experimenter and given the pile of stimuli, which were shuffled before every session. The participants were thanked for agreeing to participate and had instructions read for the experiment (Appendix C). The participants were instructed to sort the cards into two piles-- a "goes to this church" pile and a "does not go to this church" pile-- to the best of their abilities. They had to chose one of the piles for the stimuli, there could be no undecided pile. Participants were then asked to supply demographic information (Appendix B), with the primary concern being to classify each participant's age group. The experimenter recorded the results by flipping over the "goes to this church pile" and marking each number (in a column of numbers from 1 to 100) that the participant indicated as going to the church. The odd numbers then recorded served as hits, while the even number served as false alarms.

Results

The data were evaluated by use of signal detection theory, recording the numbers of hits, misses, correct rejections (or correct negatives), and false alarms. From the numbered columns that had records of each participant's response, hits and false alarms were tabulated as a whole and for each age group. A', a way to measure sensitivity for nonparametric experiments, was used to initially get a single value for the data. A' is based on a scale of 0-1, with a 1 being the best possible value. For example, a value of 0.9 is good, a value of 0.5 is a guess. The A's were calculated for each individual at the five different age groups. From this, means were calculated for each group (Appendix D).

$$A' = 1/2 + (((H - FA)(1 + H - FA))/((4H)(1 - FA)))$$

A mixed design ANOVA and multiple comparisons were performed using the A' values. The ANOVA showed that there was a significant interaction between the age of the

participant and each individual stimuli that belonged in that same category. In a test of within-subjects effects $F=5.055$, $p < .05$ (Appendix E).

Discussion

The data supported the hypothesis. Church attendees were more likely to recognize people of their own age group than they were to recognize people in other age groups. This is interesting because it suggests that people are better at recalling faces of those who are their own age in situations where there are many age groups present. It was also interesting to find that the middle school group had the highest mean A' for facial recognition. This may have been due to the fact that there were only eight participants in this group as compared to twenty from all the other age groups. However, this may also have something to do with the fact that the middle school participants would be familiar with the faces of their parents' friends and take notice of that age group as well as their own.

While there were other studies that dealt with facial recognition, none of them dealt directly with how people recognize faces across age cohorts. However, there was support for the social interaction, as related to age, aspect of the study.

While both Overbey and Pollina's (1996) and Aronson's et. al. (1996) studies performed analyses of promoting interaction and role interpretation within the family across several generations, they did not extend past immediate relatives. Slotterback (1996) also studied role interaction and attitudes, but she examined the issue from a cross-generational angle. Her study provided more information regarding attitudes of young adults toward middle-aged and older adults. Slotterback (1996) found that young adults view other generations very differently than they view themselves and their age cohorts. Slotterback's (1996) experiment provided helpful a background to draw from. It gave insights as to how age groups may view one another, which in turn might provide implications of these attitudes influencing who individuals would recognize. If different generations are viewed as substantially estranged from one's own generation, they might

not warrant as much attention as a person's immediate age cohort. While Slotterback's (1996) study, as well as those by Overby and Pollina (1996) and Aronson (1996), was not directly pertinent regarding facial recognition as a function of age, the generational interaction studies provided a decent framework for the present experiment concerning social interaction and role interpretation.

D. Otto (personal communication, September 23, 1998) was helpful in providing background information about how different sizes of congregations interact. He estimated that in each church one person would know approximately 40 people. In very small churches, the entire congregation would know one another by name and spend time with each other outside of the church. In the present study, the First UMC had a membership roster of approximately 600, with an average of about 400 across three different services per Sunday, so people would be far less likely to know each other or spend time with each other outside of church.

A study by Nezlek (1995) explored how males and females defined their relationships with one another. He found that same sex relationships were not confined to the bounds of the characteristics of the people involved. However, in opposite sex relationships were more governed by the personality and physical characteristics of the individuals involved than same sex relationships were. This research infers that we are more aware of specific personality and physical characteristics of the opposite sex. It would be a reasonable assumption that people may recognize faces of the opposite sex with more accuracy than those faces of the same sex. Future studies might want to make use of the data collected in the present study (or obtain a new set of data) to see if this is indeed the case.

Future studies may also want approach the issue from different perspectives. One might use more participants from a broader range of church sizes, socio-economical status, and urbanization. This would provide for a more precise indication of how faces are recognized in religious institutions. Another interesting direction to take would be to

use a large group, other than a religious institution. For example, a social group, such as a fraternal organization, a more structured industrial group, or even college faculty at a big university, all might provide useful compare and contrast data. Additionally, it might be interesting to address the question, "Is there some phenomenon where young people are better at recognizing faces than are older people?"

There were several confounds on the experiment. First, there was no way to regulate participants' interaction outside of the church setting. This was especially true of the junior and senior high participants who would most likely know more people than in a church situation (i.e., in the community) due to classes and extracurricular activities. This would be especially true since the youth of the church are spread throughout about four school districts. Another confound may have been the fact that all the participants volunteered to take part in the study based on a letter they received and their choice of church services and Sunday School classes that may have brought them into contact with the experimenter. Those members who chose to participate may have already been more active in the church than those who did not choose to participate, causing the sample to recognize a larger number of faces and possibly skewing the mean. One final confound that may have occurred was found in the stimulus material. The pictures from First Church were taken from the 1995 directory, and there were positive and negative aspects about the situation. Positively speaking, the participants were less likely to have recently flipped through the directory. However negatively, as a growing church many of the faces of newer regular attendees would not have appeared in the directory. The age of the directory had the most direct implications in the pictures of the middle school and high school age groups, since they would have changed the most in those three to four years, making them harder for middle aged and older adults, in particular, to recognize.

There are practical applications of this study that extend beyond the church. The study could apply to social groups that have similarly age-diversified membership. This information would be of particular interest to leaders of such groups who may be looking

to improve interaction between age cohorts. Along these same lines, the study may provide managers and others in the business world with insights as to how their employees view one another and which cohort in their particular corporation demands the most attention from the general population.

The present study was valuable to examine, especially from a social interaction view. It can apply to many of the everyday situations that people find themselves in. Groups are forming and interacting on a formal or informal basis all the time, and they will rarely have the same composition in regard to age, or any other personal factor. Understanding that age differences form barriers will make leaders as well as group members more aware of others in the group and hopefully inspire them to enhance the quality of their interactions.

Facial recognition as a function of age is not something that has been widely studied. The context of the church provided the perfect background for such a study to take place. The findings suggest that people are indeed more likely to recognize others who are close to themselves in age. Further evaluation of this topic would surely be worthwhile, especially when a broader population can be considered. Additionally, further analysis of the data presently collected could prove to be extremely insightful.

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Appendix A

Letter to Church members

Amanda E. Morgan
Box 1182, Lycoming College
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Williamsport, PA 17701
717-323-3567
moraman@lycoming.edu

Dear Members of First UMC,

My name is Amanda Morgan and I am a senior at Lycoming College, as well as a regular attendee at First Church. To graduate with departmental honors in psychology I have designed a study about friendship in the church, along with my project advisor, Dr. Howard Berthold. This study depends upon participation of the members of the church. I need help from people who are 12-years-old (sixth grade) and older. The study should only take about ten minutes of your time and can be done right at the church. There will be times available on Sundays as well as other times for your convenience. If you would being willing to help in my effort by participating in this study, please look for me at a table in the back of the church on Sunday mornings after each service. Or, you may also call or e-mail me to set up a time. The results will not contain any identifying information about how individuals responded, however, upon completion, the results of the study will be made available to everyone who participated.

Thank you for your consideration,

Amanda E. Morgan

Appendix B

Demographic Information

Which age group do you fall into? 6-8th grade 9-12th grade 18-35 36-55 56 or older

Are you: Female Male

Please answer these questions to the best of your knowledge. Feel free to leave blank any questions you prefer not to answer. All responses are confidential and the results will remain anonymous.

How many Sundays did you attend church in the last 4 weeks? 0 1 2 3 4

In the last 4 Sundays, how many of the following services did you attend? (ex: 8am 2, 10am 1, and 11:30am 4) 8am____ 10am____ 11:30am____

Do you attend Sunday School? yes no

If yes:

How often did you attend in the past four Sundays? 0 1 2 3 4 5 6 7 8

Which class(es) do you attend?

Are you involved in church activities that take place at times other than Sunday mornings? If yes, which ones?

Would you say that you know more people in the church who are: much older than you roughly about the same age as you much younger than you

Why do you think this is?

Thank you for participating!

Appendix C

Participants' instructions

Thank you for agreeing to be in my study. Basically, what I want you to do is to take this pile of cards and sort them for me into two piles. One pile should be people who attend First Church, and the other should be people who do not attend First Church. 50 of the people shown were taken from the 1995 First Church directory. The other 50 people belong to different churches from the community. You will have as much time as you need to do this. Do you have any questions for me before we start?

Appendix D
Means of A'

Middle School Participants (8)

MS	.9162
HS	.9123
YA	.8865
MA	.8154
OA	.8178

High School Participants (20)

MS	.7898
HS	.8631
YA	.7844
MA	.7416
OA	.6411

Young Adult Participants (20)

MS	.7479
HS	.8162
YA	.7861
MA	.7546
OA	.6449

Middle Adult Participants (20)

MS	.7074
HS	.8162
YA	.7695
MA	.8713
OA	.7970

Older Adult Participants (20)

MS	.5471
HS	.7430
YA	.8039
MA	.8580
OA	.8525

Appendix E
ANOVA

Tests of Within-Subjects Effects

ure: MEASURE_1

rce		Type III Sum of Squares	df	Mean Square	F	Sig.
IDENT	Sphericity Assumed	.407	4	.102	5.012	.001
	Greenhouse-Geisser	.407	3.046	.133	5.012	.002
	Huynh-Feldt	.407	3.327	.122	5.012	.001
	Lower-bound	.407	1.000	.407	5.012	.028
IDENT * GROUP	Sphericity Assumed	1.640	16	.103	5.055	.000
	Greenhouse-Geisser	1.640	12.184	.135	5.055	.000
	Huynh-Feldt	1.640	13.310	.123	5.055	.000
	Lower-bound	1.640	4.000	.410	5.055	.001
(AGEIDENT)	Sphericity Assumed	6.733	332	2.028E-02		
	Greenhouse-Geisser	6.733	252.814	2.663E-02		
	Huynh-Feldt	6.733	276.179	2.438E-02		
	Lower-bound	6.733	83.000	8.112E-02		