



Dear Readers,

We are pleased to present Volume 21 Issue 2 of the Whitman Journal of Psychology. The articles in this journal, submitted by you and your peers, are reflections of the enthusiasm many of you share for the subject matter. This issue contains articles on a wide range of subjects related to Psychology including Game Theory, Terrorism, and Kinship Selection.

Our editors for this issue included Whitman Psychology students from both the 2010-2011 and the 2011-2012 school years. We worked together to edit each article chosen for publication. In addition, our editors authored their own research for inclusion.

While we received over 30 submissions for this issue we only had a chance to review half of them before heading off for summer break. The rest of the submissions are being considered right now for inclusion in our next publication this winter. For more information about the journal, visit our website at [www.whitmanpsych.com](http://www.whitmanpsych.com).

Thank you, the students of psychology for asking questions and seeking answers through your research and experimentation. We enjoy reading all of the submissions to the Journal and look forward to opening our Inbox each day. And thank you to your teachers for encouraging your curiosity.

Enjoy!

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# ***The Whitman Journal of Psychology***

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## **Call for Submissions**

All research articles completed by high school students are welcome. Please be sure that articles are submitted in APA format with complete references. Full submission details are on page 4.

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# The Whitman Journal of Psychology

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## Content

*The Whitman Journal of Psychology* is a forum in which student-conducted research in the field of psychology may be recognized. *The Journal* contains research from many subject matters and is not limited to any specific type of study.

## Manuscript Preparation

Authors should prepare manuscripts according to guidelines established in the Publication Manual of the American Psychology Association (5th ed.). *The Journal* reserves the right to modify APA style. Manuscripts should be no longer than 15 pages and should include an abstract. Additionally, all manuscripts must include a list of references as well as parenthetical documentation in accordance with APA style. It is suggested that manuscripts include the following sections: introduction, methods, results and discussion. Manuscripts are not limited to these sections.

All manuscripts submitted for consideration may be mask (blind) reviewed at the request of the author. Clear notification must be given on the title page of a manuscript in order for it to be mask reviewed. It is the author's responsibility to ensure that identification is omitted from the manuscript. All manuscripts submitted are subject to editing on the basis of style as well as context. It is the author's responsibility to ensure clarity of expression.

## Manuscript Submissions

Submissions should include a cover letter in which the author's name, school affiliation, advisor's name, address, phone number and e-mail address are given. Authors should keep a copy of their manuscript to guard against loss. Please e-mail a copy of your file along with a cover letter with the requirements listed above to whitmanpsych@gmail.com. You will get a confirmation e-mail once we have received your submission and are able to open the file(s).

Statements contained in *The Whitman Journal of Psychology* are the personal views of the authors and do not constitute Walt Whitman High School policy unless so indicated. There is a rolling deadline for submissions.

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# Experimental Psychology

A black and white photograph of railroad tracks receding into the distance. The tracks are made of steel rails and wooden ties, with gravel ballast. They are flanked by trees and a rocky embankment. The perspective is from a low angle, looking down the tracks towards a bright light at the end of the line.

# Quantifying Cognition: Applying Quantitative Economics and Nash Game Theory to Predict and Influence Human Behavior

Tiernan J. O'Rourke  
Petaluma High School

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## Abstract

The field of psychology has experienced significant development since the days of Sigmund Freud and Carl Jung; it has branched out in some respects and become far more refined in others. Psychologist B.F. Skinner held that psychology should be a scientific study of observable behavior, and that cognition should be ignored entirely. This view, called behaviorism, dominated the psychological community for several decades. But since the invention of the computer, cognitive psychology has experienced a resurgence. The primary criticism of cognitive psychology is its apparent lack of objectivity. Cognitive psychology appears to deal only with thoughts and emotions, which do not seem to be scientifically quantifiable. This paper posits that, based on research, it is possible to quantify cognition using mathematical algorithms. Using Nash Game Theory and formulas found in the field of quantitative economics, it is possible not only to predict the outcomes of a situation, but also to influence human behavior to produce a constant outcome. This paper will look at Nash Game theory itself, as well as four aspects of applied behavioral economics: Affective Decision Making, The Value of Free Products, The Value of Peer Influence, and Social/Economic Bubbles.

## Explaining Nash Game Theory

Nash Game Theory, referred to as NGT, is an economic theory developed in 1950 by mathematician John Nash. NGT states that in any strategic situation, henceforth referred to as a game, the best outcome is produced when each player takes a course of action in which the universal reward is the highest. A situation in which no player can alter their course of action to produce a more favorable outcome is called a Nash Equilibrium. In addition to this, Nash

stated that any game in which there is a finite number of actions will have at least one mixed strategy equilibrium. This concept can be illustrated with a visual aid known as a rewards matrix. Figure 1 shows an example of a rewards matrix in reference to the infamous prisoner's dilemma.

*(Figure 1, on page 8)*

In the prisoners dilemma, two criminals, Prisoner A and Prisoner B, are given a choice; they may either remain silent or inform on the other. If they both remain silent they will get two years in prison. If prisoner A remains silent and prisoner B tells on prisoner A, prisoner A will get ten years in prison and prisoner B will be set free. If they both inform then they will both get four years in prison. Although the universally optimal result comes from both prisoners remaining silent, neither can trust the other to do so. Coupling this with the possibility of the other remaining silent and the chance of freedom, the optimal choice for either prisoner is to inform. Generally applied to economics, NGT is designed to calculate human reactions. If we assume that human behavior is the result of cognitive processes, one must conclude that NGT is a useful tool for quantifying cognition.

## Optimism Bias: Using NGT to Quantify Affective Decision Making

Optimism Bias is the proclivity to exhibit overconfidence in assessing the likelihood of favorable outcomes and to underestimate the likelihood of unfavorable outcomes. Optimism Bias tends to cause complications when trying to find a simple Nash equilibrium. In the Prisoner example, suppose that prisoner A exhibits the optimism bias and chooses to remain silent. This would disrupt the Nash equilibrium if prisoner B does not hold the same optimism. According to Bracha and Brown (2010) this can be quantified for mathematically, and therefore manipulated



like any other variable. Any social situation functions like a Nash equilibrium and, according to behavioral economists, can be represented with an appropriate equation. Bracha and Brown (2010) analyzed insurance markets using Nash Equilibria in their paper; Affective Decision making: a Theory of Optimism Bias. found that by axiomatizing the ADM potential maximizers ADM games become refutable. In more standard terms this means that when one quantifies the probability of a player's choice, by taking into account logical and emotional factors, one can then mathematically predict the player's next move. Bracha and Brown did this by analyzing the demand for insurance and found that it was possible to predict the amount of insurance someone would buy given certain factors, including his exposure to frightening or emotional advertising and their economic bracket.

### **The Cost of Zero: Using Cost/Reward Functions to Predict Human Behavior**

Would you rather have a free chocolate bar or a five cent chocolate bar? This question, asked by Shampner and Ariely (2006), may seem simple, is actually part of a complex behavioral economic theory.

In economics, the best choice to make is frequently the one with the lowest perceived cost and the highest perceived value. A product available for twenty dollars will be more desirable if on sale for fifteen. According to Shampner and Ariely, when an item is free it is perceived as having a lower cost and an increased value, so that one will take less of a free product than they will of a product they have to pay for. When MIT students were offered 1¢ Starburst candies they typically took four. When offered free Starburst candies more students accepted, but they typically took only one, (Shampner & Ariely, 2006). They also found that when two products' prices are reduced by the same amount, so the cheaper product becomes free, the cheaper product experienced an increase in perceived value and became the preferred choice. In their Zero Cost Economic model, Shampner and Ariely state that when the cost of an item is reduced to zero, the value of the product increases to greater than

that of a more expensive product, following a mathematical formula.

According to this theory, humans will predictably select a free option. This allows researchers not only to predict human behavior, but possibly to manipulate it as well. If one can rely on a player to select a zero cost choice, he can then use this to manipulate the player to make a choice he wants by giving that choice a perceived zero cost.

### **Public and Private Values: The Peer Pricing Heuristic**

Does the value others place on an object determine its perceived value? According to Ariely, Bracha, and L'Huillier (2010), it does, even privately valued products, like something of sentimental value. The researchers tested this by having a group of college students bid for the right to listen to an unpleasant, high pitched tone. This was done to ensure that the subjects would not have any pre-existing values attached to the product. The researchers found that the bids of other students heavily influenced the bids of the other members. The influence was sufficient to raise the overall bid 19.32 percent.

This was a smaller study, with a sample size of 17 people. However, it is worth mentioning due to its real world application.

### **Socioeconomic Bubbles**

In another paper, Philips and Yu (2011) pointed out that the nature of economic bubbles follows repeating trends, and noted that social trends follow the same patterns. Both follow what is known as martingale inflation. The word martingale originally comes from a gambling term, meaning to double a bet after a win and to halve the bet after a loss. In economics, martingale refers to the tendency for a stock to increase or decrease in value exponentially over a relatively short period of time. Philips and Yu (2011) note that in both economic and social bubbles there is initially a period of submartingale inflation, where the value of an item or prevalence of a social set increases every measured unit of time, in this case, a financial

quarter. When the perceived value of an item exceeds the actual value, it creates an economic bubble, and when the perceived prevalence of social set exceeds the actual prevalence, it creates a social bubble. Philips and Yu (2011) then go on to show that bubbles always pop and follow martingale deflation. By applying time stamps to various economic bubbles, specifically analyzing the 2008 housing crisis which was arguably both an economic and social bubble, Philips and Yu (2011) were able to develop an equation for predicting and graphing financial and social bubbles.

## Conclusion

For a more in-depth literary review about behavioral economics, the book Nudge by Richard H. Thaler and Cass R. Sunstien contains a wider view and more substantial explanations and applications of the field. That being said, we are left with something of a dilemma. What has been learned cannot be unlearned, and the existence of mathematical theories that allow for the prediction and manipulation of human behavior is a reality that is upon us. We must, therefore, not only be educated about these systems, but aware of their use in our everyday lives to help us live, thrive and prosper by applying them to fields in which humans frequently fail.

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### Prisoner's Dilemma Payoff Matrix for Intellectual Property

		C2	Marketer 2	I2
C1	Marketer 1	R1,R2	W1,B2	
		B1,W2	P1,P2	
I1				

$B > R > P > W$



# **Mom Always Liked Me Better: The Impact of Parent-Child Resemblance on Kin Investment**

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## **Abstract**

Dutch researchers, working with a homogeneous sample, linked perceived parent-child resemblance to parental investment. Some hypothesize that resemblance may influence men more than women in making investment decisions. This study examines the relationship between physical resemblance, personality similarity and parental investment as reported by parents of adolescents in a diverse suburban sample. It was hypothesized that fathers' investment would be most directly linked to physical resemblance, while mothers' investment would be tied to personality similarity, suggesting that fathers are more influenced by physical cues, and mothers by psychological ones.

Surveys were completed by 109 adult male and 196 adult female subjects. As predicted, mothers' personality similarity correlated with emotional closeness and time spent with child ( $R=.207$ ,  $p=.004$ ;  $R= -.309$ ,  $p<.001$ ), whereas fathers' physical resemblance correlated with emotional closeness and time spent with child ( $R=.286$ ,  $p=.003$ ;  $R= -.315$ ,  $p=.001$ ).

Data suggests a link between physical resemblance and kin investment for fathers, and for personality similarity and investment for mothers. This is also consistent with Tuijl et al.(2005). However, the results might be stronger if a large enough subsample including men no longer in a relationship with the mother of the target child could be collected for separate analysis.

## **Introduction**

Evolutionary theory holds, in order to increase their own reproductive success, parents should choose to invest in children to whom they

are genetically related (Trivers 1972; Alexander

1974). Unlike mothers, whose maternity is clear, fathers tend to rely on physical similarities to assure themselves of paternity. The flippant saying, "mothers baby, fathers maybe" is not without power. In this way, parent-child resemblance, whether in appearance or behavior, has long been accepted as a reasonable indication of genetic relatedness (Alexander 1974). Due to these differences in parental certainty, it stands to reason that men are more sensitive to their own resemblance to their offspring than women are when faced with decisions regarding parental investment.

This essay draws its inspiration from the theories of a man known for his contributions to the biological, rather than the behavioral, sciences. Darwin's (1859) theory of natural selection posits that variants that aid an organism's survival are most likely to be transmitted to future generations. This results in three products: adaptations, by-products and noise. While these principles have been traditionally applied to anatomy and physiology, since the early 1990s, many behavioralists have promoted a hypothesis that this Darwinian triumvirate can also provide psychologists and animal behavioralists with explanations for thousands of behavioral and psychological adaptations (Alcock 2005; Buss 2005). Although research within evolutionary psychology has expanded steadily in recent years (Cornwell, Palmer, Guinther, & Davis 2005), some researchers within mainstream psychology are still surprisingly unfamiliar with its theoretical framework and application, leading to common misconceptions (Cornwell et al. 2005; Park 2007). Therefore, the purpose of evolutionary psychology is to study human

As late as 2008, it remains unclear just how large of a role offspring resemblance plays in paternal investment decisions. If resemblance does not move mothers to the same degree of devotion as fathers, what does? The first clue surfaced in 2004 when Apicella and Marlowe combined questions about physical resemblance and personality similarity into a single measure of “resemblance.” Though operationally flawed, because it does not allow researchers to distinguish physical resemblance from personality similarity, Apicella and Marlowe’s 2004 survey nonetheless offered an important theoretical contribution. The first study to examine personality similarity in relation to parental investment found personality similarity to be closely linked to the quality of the parent-adolescent relationship for mothers, but not for fathers (van Tuijl, Branje, Dubas, Vermulst, & van Aken 2005).

Drawing on evolutionary psychology and a growing, but still rather underdeveloped literature, Heijkoop, Dubas and van Aken (2009) sought to definitively link physical resemblance and personality similarity to parental investment to fathers and mothers respectively. Their conceptually and methodically sound study was limited to a degree by its small, homogeneous sample. Heijkoop and her colleagues surveyed individual parents of ninety predominantly white middle and upper class Dutch elementary school children. This study represented a groundbreaking start of the next phase of parental investment research. Heijkoop synthesized a varied body of previous research, which argued for a gender-resemblance-investment link among fathers (Platek et al., 2002, 2003, 2004; Volk & Quinsey 2002, 2007; Apicella & Marlowe, 2004), and linked it to an association between personality similarity and parental investment for mothers. Just as important, she has also incorporated the theoretical innovation of Apicella and Marlowe (2004) and the thorough scholarship of Van Tuijl (2005), who pioneered the gender-personality-investment triad for mothers.

Heijkoop’s conclusions laid the foundation for this research but also identified several new avenues for research of evolutionary psychology. The current study seeks to validate and advance

the important work of Heijkoop and her Utrecht colleagues among a more socioeconomically, racially, and age diverse sample population.

## **Procedure**

### **Participants**

Surveys were distributed to parents through their adolescent children at two very different suburban New York high schools. District A (Lawrence) is among the most racially and socioeconomically diverse in New York State, tucked into the southwest corner of Nassau County, contiguous with New York City. District B (Levittown) is a predominantly Euro-American (85%), solidly blue-collar working and middle class, long island suburb. Students were given two copies of the survey and an informed consent slip detailing the nature of the research to bring home to their parent(s). Children ranged from seventh grade to twelfth grade (13-18 years of age) and attended one of the two suburban public school districts. Overall, 196 mothers and 109 fathers drawn from a wide range of socioeconomic and racial backgrounds completed the survey. *(Figure 1, on*

*page 18)*

### **Measures**

#### *Independent (X) Variables*

##### **Parent-child resemblance**

Parents reported from their own perspective on physical resemblance via a single item: “I think my child looks like me.”

##### **Personality similarity**

This was gauged by subscales of a 44-item version of the Big Five questionnaire. Across a wide variety of studies involving trait-descriptive terms, five broad factors have consistently been identified (see Goldberg 1992). The empirical evidence for the “Big-Five” representation has been used to describe traits (see Peabody & Goldberg 1989; Goldberg 1990). Total personality similarity [T (p-ch)] serves as a summary variable to represent all Big 5 variables.

#### *Dependent (Y) Variables*

## Emotional closeness

Eight items, based on a five-point Likert scale, with questions such as, "I feel I have a close bond with this child." measured this variable. A high score indicated a very high self-perceived level of emotional closeness between the parent and his or her child.

## Time spent together

All reported by the parent, from his perspective. This was also reported on a five-point Likert scale based on six items. It measured the amount of time parents spend with their children on a daily basis involved in everyday activities (TV viewing, eating, assisting with homework, playing/reading, household tasks, and going out; Dubas & Gerris 2002). A low score indicated a great deal of time spent by the parent with their child.

## Instruments

*(Figure 2, on page 18)*

## Hypothesis

In 2009, Heijkoop and her colleagues established a link between parent-child resemblance and kin investment by demonstrating differences in the level of investment between mothers and fathers linked to differences in perceived parent-child resemblance. Heijkoop et. al. (2009) provided compelling evidence that fathers tend to be more invested in their children if they share similar physical features, while mothers tend to be more invested in offspring with similar personality traits. The current study not only expands this research to a new, more diverse American sample, but also considers two additional variables: 1) Does the gender match or mismatch of parent-child impact these investment decisions in any way? 2) Does birth order influence parental investment?

Specifically it was hypothesized that:

For fathers:

Perceived parent-child resemblance would predict two measures of parental investment ( $p < .01$ ):

- Emotional Closeness (of bond to child)
- Time (spent with child)

Perceived personality trait similarities (Big 5 Traits) would not predict two measures of investment ( $p > .01$ ):

- Emotional Closeness
- Time

For Mothers:

Perceived personality trait similarities (Big 5 Traits) would predict two measures of investment ( $p < .01$ ):

- Emotional Closeness
- Time

Perceived parent-child resemblance would not predict two measures of parental investment ( $p > .01$ ):

- Emotional Closeness
- Time

Covariates:

Birth order and parent-child gender match/mismatch will not mediate any of the above relationships.

## Results

1) As predicted, mothers exhibited a much higher correlation between personality and closeness (Table 1). For total personality similarity [T (p-ch)] and emotional closeness the Pearson's R was .207, ( $p = .004$ ). Mothers reported a significant correlation between total personality [T (p-ch)] and time: -.309, ( $p < .001$ ).

2) Fathers' self-reports also validated the hypothesis that they would be much more invested in children who physically resemble them (Table 2). Fathers demonstrated a high correlation between appearance and closeness with a Pearson coefficient of .286 ( $p = .003$ ). In addition, there was a significant correlation between appearance and time ( $[R] = .315$ ,  $p = .001$ ). Not surprisingly, there was a high correlation between closeness and time ( $[R] =$

As predicted, Linear and Multiple Regression analysis demonstrated that neither birth order nor parent-child gender match or mismatch had any significant mediating effect on parental investment decisions. These decisions, however, were generally parent gender based. See Appendix 1: Linear and Multiple Regressions for detailed results and analyses.

\* \* \*

Overall, data analysis supports of Heijkoop's hypothesis. Fathers show an increase in time investment when their children physically resemble them, while mothers show greater investment when their children demonstrate similar personality traits. It has also been shown that birth order generally does not affect the statistical significance of regressions. Often the addition of these additional x variables had little effect on the significance of the regression except in select cases such as appearance and closeness for mothers, time and personality for fathers, and closeness and appearance for fathers.

## Discussion

The primary objectives of this study were to explore several tenets of evolutionary psychological theory and to answer the following questions:

1. What are the differences between fathers and mothers in regard to parental investment based on parent-child physical and behavioral resemblance?
2. How, if at all, does birth order affect parental investment?
3. Does parent-child gender parallelism affect investment of fathers and mothers, and if so, how?

Some may wonder if the parents of adolescents are appropriate subjects for study because teens tend to be more independent of their parents. However, this would not result in an inaccurate measurement of personality. In this context, parents of teenager are the ideal study group. Teenagers have more developed physical features and personalities than do younger children, so physical or behavioral resemblance is more easily determined. The re-

sults of this study support the notion first advanced by Heijkoop in 2009. Not only are mothers more invested in their children who have similar personalities, but also fathers' paternity uncertainty appears to cause greater dependence on facial resemblance in determining time investment. These results match the conclusions of previous studies that placed a degree of importance on facial resemblance for fathers and on personality similarity for mothers. These results are consistent with those of Tuijl et. al. (2005), which linked personality similarity to the quality of parent-adolescent relationships for mothers, but not for fathers, in a context of parental investment.

This research fills a gap in the existing literature by providing a clear, empirical study demonstrating that not only does parent gender impact time investment based on personality or physical resemblance, but also demonstrating that birth order and parent-child gender parallelism play a negligible role in time investment decisions. One challenge for researchers like Heijkoop will be to develop and implement strategies to allow easier access to adolescent subjects at more diverse schools.

Nonetheless, we hope that this essay will encourage parents to re-evaluate their intra-familial relationships. In the western world, where divorce is becoming a virtual epidemic more time may need to be devoted to strengthening familial relationships. Whether this focus leads to a reduced rate of divorce or improved parent-child relationships post-breakup is not for this essay to determine. The degree to which parental investment decision-making is due to heredity, biological bases, however, cannot be overlooked.

## *Limitations and Future Directions*

A larger, more mature sample size would be required in order to obtain truly significant results regarding influences of birth order and parent-child parallelism on investment decisions. Results might also be strengthened if a large subsample, which included men no longer in a relationship with the mother of the target child, could be collected for separate analysis. The theory behind this is that fathers who have a physical resemblance with their children could be inclined



to spend more time with them, even if they do not live in the same household. Fathers in this situation would most likely seek ways to spend as much time as they can with their children, knowing that physical resemblance is a good indicator of kinship (Alexander 1974). Lastly, a study involving couples might be instructive because it would ensure a balanced male - female sample, something that this study did a reasonably good job soliciting.

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- ### Appendix 1: Linear and Multiple Regressions
- A1) Simple linear regressions confirmed mothers' insignificant correlation between time and appearance:  $[R] = .082$  ( $p = .251$ ). This was further displayed in multiple regressions, which included three independent variables (appearance, birth order and parent-child gender match) with the dependent variable being time. Mothers reported a .123 correlation ( $p = .744$ ), while the individual p-values were all insignificant ( $p = .287, .792, .802$ , respectively). The introduction of two additional x variables did little to affect the statistical significance of the regression. The three independent variables accounted for 1.5% of the variance in y-variables, via the following:
- | Simple Regression   |       |
|---|-------|
| $[R]$   | .082  |
| $r^2$   | .007  |
| P-value   | .2514 |
| [R] means the absolute value of the Pearson's R, the correlation coefficient. |       |
- | Multiple Regression            |       |
|--------------------------------|-------|
| $[R]$                          | .123  |
| $r^2$                          | .015  |
| Regression P-value             | .7443 |
| Appearance P-value             | .2877 |
| Birth Order P-value            | .7924 |
| Gender Match/ Mismatch P-value | .8023 |



A2) Similar regressions were conducted for fathers, who reported a highly significant correlation between appearance and time  $[R] = .315$  ( $p < .001$ ) as shown in table 2. Once further data was analyzed with a multiple regression combining appearance, birth order and parent-child gender match/mismatch as independent variables, a higher correlation was reported ( $[R] = .348$ ,  $p = .05$ ) with individual p-values of .022, .510, and .307 correspondingly. While none of the additional x-variables were significant on their own, when combined the regression remained significant and additional variance was accounted for (from 9.9% to 12.1%).

Simple Regression	
[R]	<b>.315</b>
$r^2$	<b>.099</b>
P-value	<b>.0008</b>
[R] means the absolute value of the Pearson's R, the correlation coefficient.	

Multiple Regression	
[R]	<b>.348</b>
$r^2$	<b>.121</b>
Regression P-value	<b>.0500</b>
Appearance P-value	<b>.0222</b>
Birth Order P-value	<b>.5102</b>
Gender Match/ Mismatch P-value	<b>.3007</b>

B1) Simple regressions were run again for the same dependent variable (time) but against total personality similarity  $[T(p-ch)]$  as the independent variable. Mothers exhibited a .309 correlation with a p-value of less than .001. Birth order and parent-child gender match/mismatch were then considered as additional independent variables and the multiple regression became even more powerful. Its new correlation of .488 produced a stellar p-value of  $< .001$ . However, neither of the new x variables were significant on their own. These variables increased the  $r^2$  of the regression from .096 (simple) to .239 (multiple).

Simple Regression	
[R]	<b>.309</b>
$r^2$	<b>.096</b>
P-value	<b>&lt;.0001</b>
[R] means the absolute value of the Pearson's R, the correlation coefficient.	

Multiple Regression	
[R]	<b>.488</b>
$r^2$	<b>.239</b>
Regression P-value	<b>&lt;.0001</b>
Personality P-value	<b>&lt;.0001</b>
Birth Order P-value	<b>.3989</b>
Gender Match/ Mismatch P-value	<b>.9338</b>

B2) The same regressions as in Section B1 were run for fathers. For the simple regressions, fathers reported a marginally significant correlation between time and total personality:  $[R] = .169$  ( $p = .078$ ). However, once the multiple regression was run for fathers with total personality, birth order, and parent-child gender match/mismatch as the independent variables, this modest link became insignificant:  $[R] = .260$  ( $p = .237$ ). The addition of birth order and gender match/mismatch variables seemed to weaken the regression. Slightly more variance in x was explained as a result of the additional x variables (6.8% as opposed to 2.9%). However; the marginally significant regression was actually weakened when the p-value was considered.

Simple Regression	
[R]	<b>.169</b>
$r^2$	<b>.029</b>
P-value	<b>.0782</b>
[R] means the absolute value of the Pearson's R, the correlation coefficient.	

Multiple Regression	
[R]	.260
r <sup>2</sup>	.068
Regression P-value	.2373
Personality P-value	.1917
Birth Order P-value	.3345
Gender Match/ Mismatch P-value	.2032

C1) When the dependent variable was switched from time to emotional closeness, the correlation between this variable and appearance was the same for mothers. In a simple regression, mothers reported a miniscule [R]-value of .013 (p= .854). When a multiple regression was conducted to look for a correlation between closeness (y) and three x variables (appearance, birth order, and gender parallelism), the correlation became marginally significant, yielding a .277 correlation and a .094 p-value. The regression was insignificant with only appearance as the independent variable, but when the other two variables were included, the regression became marginally significant with birth order as the only meaningful variable (p=.050)

Simple Regression	
[R]	.013
r <sup>2</sup>	.0002
P-value	.8539
[R] means the absolute value of the Pearson's R, the correlation coefficient.	

Multiple Regression	
[R]	.277
r <sup>2</sup>	.076
Regression P-value	.0936
Appearance P-value	.9700
Birth Order P-value	.0500
Gender Match/ Mismatch P-value	.1365

C2) The same regressions conducted for Section C1 were reconducted for fathers. In a simple regression, fathers reported a significant correlation between closeness and appearance: [R] = .286 (p= .003). The multiple regression was a .252 correlation, but the p-value soared to .267. Simple regression showed that appearance was indeed significant when it was the sole independent variable, but when two additional variables were considered, multicollinearity may have become an issue.

Simple Regression	
[R]	.286
r <sup>2</sup>	.082
P-value	.0025
[R] means the absolute value of the Pearson's R, the correlation coefficient.	

Multiple Regression	
[R]	.252
r <sup>2</sup>	.063
Regression P-value	.2657
Appearance P-value	.0632
Birth Order P-value	.8868
Gender Match/ Mismatch P-value	.7282

D1) The last set of regressions involved closeness and total personality similarity [T (p-ch)]. As predicted, this was significant for mothers who reported an [R]-value of .207 (p= .003). When reanalyzed with multiple regression with birth order and gender parallelism as additional independent variables, it remained statistically significant: [R] = .348 (p= .015). The multiple regression increased the value of r<sup>2</sup> from .043 (simple) to .121 (multiple). While the regression remained significant as a whole, the new x variables independently were insignificant.

Simple Regression	
[R]	.207
r <sup>2</sup>	.043
P-value	.0036
[R] means the absolute value of the Pearson's R, the correlation coefficient.	

Multiple Regression	
[R]	.152
r <sup>2</sup>	.023
Regression P-value	.7033
Personality P-value	.3305
Birth Order P-value	.7892
Gender Match/ Mismatch P-value	.5817

Multiple Regression	
[R]	.348
r <sup>2</sup>	.121
Regression P-value	.0154
Personality P-value	.0466
Birth Order P-value	.0745
Gender Match/ Mismatch P-value	.1051

D2) These regressions were rerun for fathers. Predictably, in the simple regressions fathers reported statistically insignificant information regarding emotional closeness and total personality: [R] = .042 (p= .662). Reanalyzed in a multiple regression similar to the one in Section 9, fathers generated more statistically insignificant information with an r-value of .152 (p= .703). The r2 for the multiple regression increased, however the regression remained insignificant.

Simple Regression	
[R]	.042
r <sup>2</sup>	.002
P-value	.6620
[R] means the absolute value of the Pearson's R, the correlation coefficient.	

## Appendix 2: Survey Questions

I see myself/ my child as someone who...

- ...Is talkative
 

Myself: Strongly Disagree	1	2	3	4	5
My Child: Strongly Disagree	1	2	3	4	5
- ...Tends to find fault with others
 

Myself: Strongly Disagree	1	2	3	4	5
My Child: Strongly Disagree	1	2	3	4	5
- ...Does a thorough job
 

Myself: Strongly Disagree	1	2	3	4	5
My Child: Strongly Disagree	1	2	3	4	5
- ...Is depressed, blue
 

Myself: Strongly Disagree	1	2	3	4	5
My Child: Strongly Disagree	1	2	3	4	5
- ...Is original, comes up with new ideas
 

Myself: Strongly Disagree	1	2	3	4	5
My Child: Strongly Disagree	1	2	3	4	5
- ...Is reserved
 

Myself: Strongly Disagree	1	2	3	4	5
My Child: Strongly Disagree	1	2	3	4	5
- ...Is helpful and unselfish with others
 

Myself: Strongly Disagree	1	2	3	4	5
My Child: Strongly Disagree	1	2	3	4	5
- ...Can be somewhat careless
 

Myself: Strongly Disagree	1	2	3	4	5
My Child: Strongly Disagree	1	2	3	4	5

\* \* \*

Respond to each of the following statements by indicating the choice that best describes YOUR view:

Very Inaccurate 1	Moderately Inaccurate 2	Neither Accurate Nor Inaccurate 3	Moderately Accurate 4	Very Accurate 5
----------------------	----------------------------	--------------------------------------	--------------------------	--------------------

- "I think my child looks like me."
 

Very Inaccurate	1	2	3	4	5
-----------------	---	---	---	---	---
- "I feel that I have a close bond with this child,"
 

Very Inaccurate	1	2	3	4	5
-----------------	---	---	---	---	---
- "I worry that this child does not really love me."
 

Very Inaccurate	1	2	3	4	5
-----------------	---	---	---	---	---
- "My feelings for this child are less warm and close than I expected."
 

Very Inaccurate	1	2	3	4	5
-----------------	---	---	---	---	---
- "Sometimes I think that I do not have such a close bond with my child."
 

Very Inaccurate	1	2	3	4	5
-----------------	---	---	---	---	---
- "I often let my child know that I love him/her,"
 

Very Inaccurate	1	2	3	4	5
-----------------	---	---	---	---	---
- "I hug this child often,"
 

Very Inaccurate	1	2	3	4	5
-----------------	---	---	---	---	---
- "I often compliment this child,"
 

Very Inaccurate	1	2	3	4	5
-----------------	---	---	---	---	---
- "Sometimes I say to my child, 'You are my little angel,' or the equivalent."
 

Very Inaccurate	1	2	3	4	5
-----------------	---	---	---	---	---

How much time do you spend with your child engaged in each of the following activities?

1. Sports/clubs/activities

A Great Deal 1 A Fair Amount 2 Some 3 Not Much 4 Almost None 5

2. Going out

A Great Deal 1 A Fair Amount 2 Some 3 Not Much 4 Almost None 5

3. TV viewing

A Great Deal 1 A Fair Amount 2 Some 3 Not Much 4 Almost None 5

4. Eating

A Great Deal 1 A Fair Amount 2 Some 3 Not Much 4 Almost None 5

5. Assisting with homework/projects

A Great Deal 1 A Fair Amount 2 Some 3 Not Much 4 Almost None 5

6. Household tasks

A Great Deal 1 A Fair Amount 2 Some 3 Not Much 4 Almost None 5

(figure 1)

Parent Gender	Number of subjects
Male	109
Female	196

(figure 3)

Parent Ethnicity**	Sample Percentage (Sample Number)	District A (Lawrence UFSD)	District B (Levittown UFSD)	Nassau County	United States*
White	70.7% (217)	36.1%	90.6%	74.9%	69.1%
Black	7.8% (24)	22.4%	0.7%	10.1%	12.3%
Hispanic	11.4% (35)	33.9%	5.3%	10.0%	12.5%
Asian/Pacific	9.4% (29)	7.1%	3.5%	4.8%	3.6%
Native American/Other	0.65% (2)	.5%	0.0%	0.2%	0.9%

\*The total does not equal 100% because of those respondents who reported themselves as "multiracial."

\*\*New York State Education Department Categories

Sources

- Lawrence Union Free School District. Weekly Report to the New York State Basic Educational Data System, 11/12/10.
- Levittown Union Free School District. Weekly Report to the New York State Basic Educational Data System, 10/15/10.
- United States Census Bureau, Current Population Reports, 2010.

(figure 2)

Title	Authors	Purpose/Sample Questions
Big 5 Personality Survey	Goldberg (1992); adapted by Tuijl et. al (2005)	-examines subjects' personality traits across 5 broad dimensions. (Likert Scale: Strongly Disagree=1 / Strongly Agree=5)
Extraversion		# 1 "I see myself/my child as someone who is talkative." # 6 "I see myself/my child as someone who is reserved."
Agreeableness		# 2 "I see myself/my child as someone who tends to find fault in others." # 7 "I see myself/my child as someone who is helpful and unselfish with others."
Conscientiousness		# 3 "I see myself/my child as someone who does a thorough job." # 8 "I see myself/my child as someone who can be somewhat careless."
Neuroticism		# 4 "I see myself/my child as someone who is depressed/blue." # 9 "I see myself/my child as someone who is relaxed, handles stress well."
Openness		# 5 "I see myself/my child as someone who is original, comes up with new ideas." #10 "I see myself/my child as someone who is curious about many things."
Physical Resemblance	Heijkoop, Dubas & van Aken (2009)	-examines the extent to which subjects feel their child looks like they do. (Likert Scale: Very Inaccurate=1 / Very Accurate=5) "I think my child looks like me."
Emotional Closeness	Dubas & Gerris (2002)	-examines the extent to which subjects feel their child looks like they do. (Likert Scale: Very Inaccurate=1 / Very Accurate=5) e.g.: "I feel I have a close bond with this child."
Time Spent Together	Dubas & Gerris (2002)	-measures parent-child closeness by examining the time spent together. (Likert Scale: A Great Deal=1 / Almost None=5) "How much time do you spend with your child engaged in each of the following activities?" (TV viewing, eating, aiding w/ HW...)



# **Conformity Strength in Relation to Age Difference**

## **Brendan Gordon, Jacob Sackleh, and Garret Zuk**

### **Lakeland High School**

#### **Advisor: Stacy Oddi**

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#### **Abstract**

to conform to those around them

This study examines the level at which any given person will conform to a group's behaviors, even if they consciously question its accuracy. We gave high school seniors, juniors, and middle school seventh-graders a basic test in which they choose from three corresponding lines to identify which one matched the first. Our primary concern was to see how the differences in age between confederates and participants would influence the strength of conformity. We predicted that conformity would increase when the confederates were older than the participant in the experiment was. At a rate of 50 percent, the strongest conformity did indeed occur when a middle schooler was among a group of senior confederates, suggesting that both age and authority are factors that influence conformity.

#### **Literature Review**

Social psychology, particularly the subject of conformity, is one of the most intriguing and heavily researched topics studied today. It has been found, somewhat surprisingly, that people have an innate tendency to conform their behavior to those around them, even when the negative consequences of these actions are obvious. Some psychologists suggest that there may be an evolutionary component to this phenomenon. In a more primitive age, it would have been far more difficult to survive in isolation than it would have been as part of a larger group. This relates to Darwin's theory of Evolution which states that those who conformed to a larger group would survive. Those who survived would pass down this personality trait, willingness to conform, to future generations. In addition to the evolutionary aspect, there are other obvious benefits to conformity. Group membership has been shown to increase both self-esteem and an individual's sense of self worth. According to Maslow's hierarchy of needs and motivation theory, individuals are motivated

in order to achieve a sense of belongingness. Yet, at the same time, there can be great danger that accompanies blindly conforming to the behaviors of others. When the behaviors of others place an individual in a situation detrimental to his own health or the health of others, logically it doesn't make sense for the individual to conform. It has been repeatedly proven, however, that resisting the urge to conform is much more difficult in practice than in theory. Two key studies, the Asch line experiment and the Darley/Latane smoke filled room study, are two such examples.

In 1951, Solomon Asch devised his classic social experiment in which it was clear that participants provided inaccurate responses in an effort to conform. The experiment consisted of 123 male college students. Each of these students was grouped with five other males, all of whom were confederates. The participant (subject) was told he would be participating in a vision test. The tests presented a picture of a single line and then presented three other lines; A, B and dC, all of different lengths. The confederates were then asked to identify, out loud, which line resembled the first line presented in terms of length. The participant was the one to answer last, and even though the answer was obvious, when the group members that preceded him answered the question incorrectly, they would sometimes follow suit.

At the end of eighteen trials, one-third of the participants conformed to the confederates' responses with the clearly incorrect response. Furthermore, all those in the study went through the experiment seven times each, and 75% of all participants conformed to the groups incorrect view at least once. According to Saul McLeod (2008), "People conform for two main reasons: because they want to fit in with the group (a rationale known as normative influence) and because they believe the group is better informed than they are (informational influence)."

A second important study regarding conformity in social settings is referred to as the smoke filled room study. This study was organized by John Darley and Bibb Latané as an emulation and modification of the study run by Solomon Asch. The study was designed to determine if the participant would conform even if he or she felt the other people present in the room were making a harmful decision. The modification of this experiment involved putting the students into two scenarios in which they were in a room that was exposed to smoke. In one of the scenarios, the student was alone in the room and in the other scenario, the student was with others, all confederates, who would be instructed not to react to the smoke coming into the room. (Boese, 2008)

It turns out that the participants, when on their own, chose to exit the room almost immediately in reaction to the smoke (Boese, 2008). Interestingly enough, the situation was extremely different when confederates were present. When exposed to a smoke filling up a room where the others present did not leave, the student conformed the majority of the time (Boese, 2008). This demonstrated how people will conform even in a potentially life threatening situation. These results reveal a tendency to conform even if this behavior is dangerous.

Both the Asch and the Darley and Latané studies provided insight into the nature of conformity, yet were not comprehensive and inclusive. The Asch study and subsequent research have all demonstrated that certain conditions, like the number of individuals present, the anonymity of the individual, the difficulty of the judgment and whether or not others observe the response of the participant, can all have an effect on the strength of conformity. One consideration absent from these findings is the effects of age difference on the strength of conformity. Does a difference between the age of the participant and that of the confederates significantly alter results? This question appears to have been left unanswered. The purpose of our study was to examine whether an age discrepancy between the participant and that of the confederates (both older and younger than the participant) affects the strength of

conformity when compared to a baseline test of similarly aged participants and confederates. We expected to see the strength of conformity increase when the participant was significantly younger than the confederates and decrease when the participant was older than the confederates.

## **Method**

### **Participants:**

Our study used a sample of middle and high school students from Lakeland High School and White Lake Middle School. There were ten middle school students and ten high school seniors involved in the study. We selected these students by randomly choosing classes to go to and then pulling one student from the chosen room. They were asked if they would be willing to volunteer as a part of our experiment but were not made aware of their specific role in the study. We told the participants that we were studying perceptual abilities in school aged children. After they had agreed, the volunteers were asked to sign a half-sheet of paper stating that they understood that, no matter what, they did not have to continue to participate in the study and were allowed to leave if they felt uncomfortable. The students consisted of 14 males and 6 females.

### **Design:**

Our experiment was composed of four separate trials. Two of the trials used participants who were all of the same age: one with all senior participants and one with all middle school participants. Together, these two experiments were used as a control setup, and a baseline to refer back to later. The other two experiments contained students of mixed ages: one with four senior students and one middle school student and the other with four middle school students and one senior student. In the control setups, our sample was randomly assigned to either the role of confederate or participant. In the mixed age experimental setups, however, we made sure that there was one participant of a different age among the confederates. This permitted us to test how the difference in ages between the confederates and the participant would affect the strength of conformity. We measured the strength of conformity as the number of times the



## Results

In the four trials, conformity was only seen once out of eight possible opportunities. The trial with the panel of senior confederates and middle school participant (trial number three) saw conformity 50% of the time. In the other three trials, the participants all correctly identified the line of the correct length, even when the other four students chose something else. The four trials were divided into the three sub-categories, labeled below as trials with equal ages, trials with older confederates, and trials with younger confederates. The percent of conformity for each sub-category is shown below in Figure A.

Category	Percent Conformity
Equal Ages	0%
Older Confederates	50%
Younger Confederates	0%

Figure A

## Discussion

Over the course of the last 40 years, it has been shown that, when asked to respond to a question where there is a clear, correct response, people tend to conform between 60 and 70 percent of the time to the incorrect responses. Solomon Asch found that, either because the participant was nervous about being the odd man out or because he was afraid of disturbing the experiment, they would intentionally give the incorrect response. In his research, Darley demonstrated how that principle would hold true even under obviously dangerous circumstances. This type of conformity is a dangerous phenomenon that appears to be innate for most. Levels of conformity tend to decrease when answers are not stated verbally and when the participant is in a more comfortable or natural environment. A certain degree of conformity has been shown to exist in nearly all controlled setups. As a research group, we hypothesized that the level of conformity would change depending on the difference in ages between the participant and the confederates. We expected to see the level of conformity increase when the participant was younger than the confederates providing incorrect responses.

Our experiment showed that this

hypothesis is at least partially true. We were surprised that neither of the participants in the equal aged trials conformed either time. However, we did expect to see the lack of conformity present in the trial where the confederates were younger than the participant as well as the increased conformity in the trial where the confederates were older than the participant. Both of these results fit with our initial hypothesis. As we hypothesized, there seems to be an inherent trust in the knowledge and perceptual abilities of those older than us, leading us to put more faith in their answers and eventually conform ourselves to behave in a similar manner. Similarly, the trial featuring younger confederates demonstrated the tendency to assume a role of dominance over those younger than them, especially when this age difference is easily perceptible. While there may not be a great difference between a 35 year old participant and 40 year old confederates, the difference between 17 year old confederates and a 12 year old participant played a significant role.

Several confounding variables could have played a role in skewing these results. We only conducted a modest six trials with each of our groups before we had to come to a conclusion. In a more ideal scenario, we would have run at least 10-15 trials in each sub-category and found a more accurate average of the levels of conformity. However, in the short time span provided, finding that size of a representative sample would have been extremely difficult. On this note, if we were to run this experiment again, we would also like to find a more diverse sample. Using students from the same school system provides a level of familiarity between participants that could have skewed results. If the participants were friends or knew each other well this would have significantly decreased the chance of witnessing any type of conformity. In a more neutral, anonymous environment with a more diverse sample to work with, we believe that we could have eliminated several extraneous variables.

Our small study suggests that there is need for further research in the area of conformity related to age difference. Psychologists with an opportunity to work with a larger population and sample size may be able to gain further insight

into how age differences can have an effect on the strength of conformity. In addition, we think that it would be interesting to see how this difference changes as the overall age of the members increases or decreases. For instance, what would change the strength of conformity more, a 10 year age difference between 20 and 30 year olds or a 5 year age difference between 10 and 15 year olds? What plays a greater role in the overall strength of conformity, the age gap itself or the perceptibility of the age difference between individuals? This question was not effectively answered through the design of this experiment, and hopefully will be addressed in future research.

In conclusion, we believe, based on our findings, that a difference in the age of different individuals can have an effect on the strength of conformity for relatively simple tasks. Conformity appears most likely to increase when the age of the majority is higher than that of the individual being observed. On a related note, conformity appears to decrease, or at the very least remain constant, when the age of majority is lower than that of the individual being observed. Conformity is a force influenced by a great number of factors, and age differences certainly play a role.

## References

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- McLeod, S. (2008). Asch Experiment. Retrieved from <http://www.simplypsychology.org/asch-conformity.html>

## Appendix A

Hello! Thank you for helping us today. These are your instructions:

You are going to be in a line with four other students. When it's your turn, we are going to ask you whether line A, B, or c matches the length of the fourth line. We will repeat this process 6 times. No matter what you think is the right answer, when we ask you the question, you are going to give the following responses.

1. A
2. C
3. A
4. B
5. C
6. B

Some of the answers are intentionally wrong. Please ignore this and give the responses that you see above. It is extremely important for you to do this if the experiment is going to work. Keep this instruction sheet with you when we begin the experiment, but DO NOT SHOW ANYONE!! This is also very important.

Thank you!!

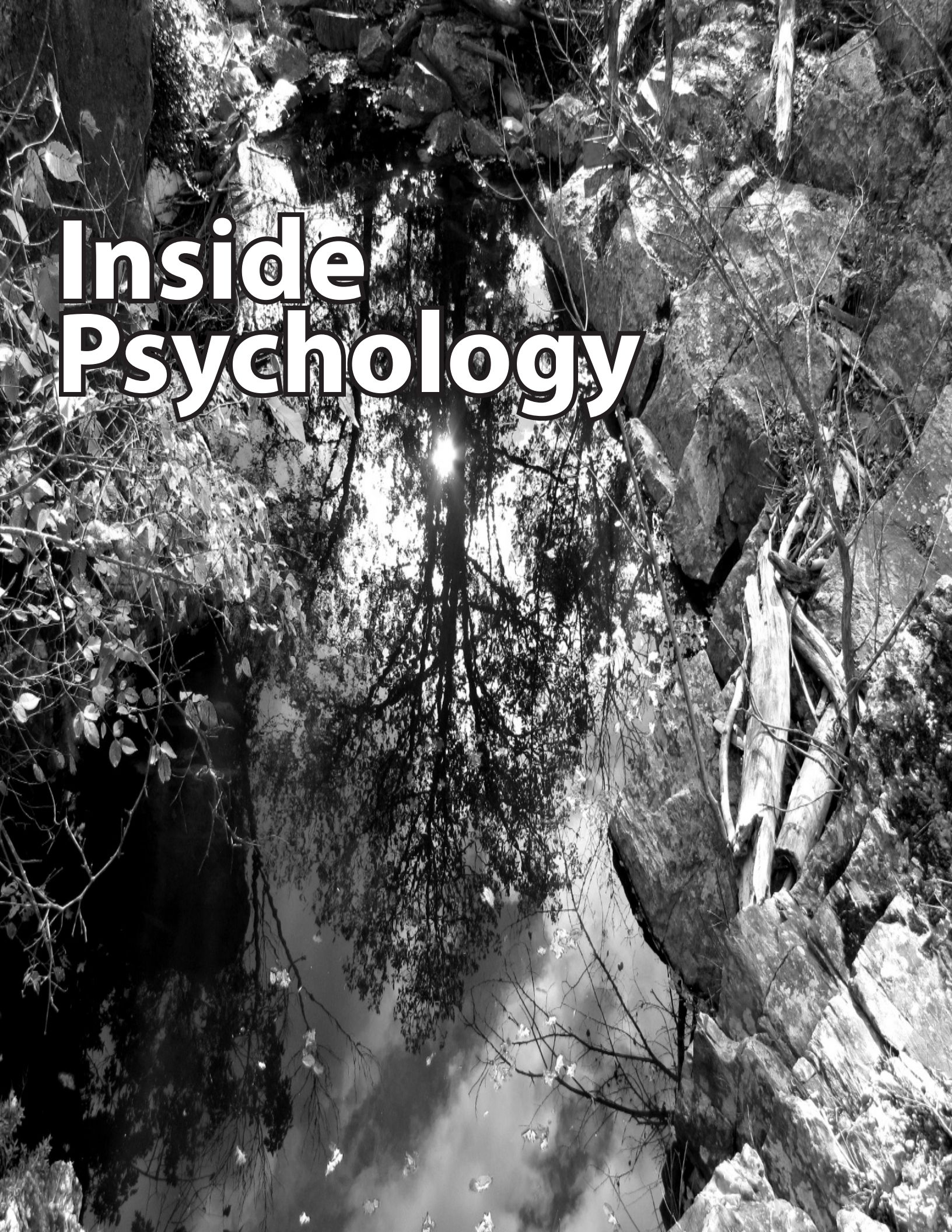
## Appendix B

Hello! Thank you for helping us today. These are your instructions:

You are going to be in a line with four other students. When it is your turn, we are going to ask you whether line A, B, or C matches the length of the fourth line. We will repeat this process six times. Do your best to answer as accurately as possible, and take as much time as you need.

Thank you!!





# Inside Psychology



# **The Vicious Cycle of Obesity**

## **Corinne Osnos and Daniel Karr**

### **Walt Whitman High School**

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Food is a basis for all life, an integral part of survival. According to Maslow's Hierarchy of Needs, humans must fulfill their most basic physiological necessities before moving onto other needs. In some ways obesity and the health risks associated with it can be seen as the inability to move beyond the lowest tier in the hierarchy. Those afflicted are greatly surpassing their basic nutritional requirements, but are nonetheless inhibited from achieving self-actualization, their potential hindered by the health dangers and social ridicule that accompanies the condition. With the prevalence of fast food, oversized portions, and general inactivity in society today, obesity is a problem that plagues our generation. According to the Food Research and Action Center, two thirds of Americans are considered overweight or obese, an overwhelming statistic (Fleigal, 2012). Obesity is a serious condition, one that some scientists are striving to prove is even a disease. The causes of obesity are often oversimplified by the general public, however, and the obese looked upon with disdain. A key issue to be explored is how accurate the portrayal of obesity is in society; are the obese victims of a vicious cycle, or simply unable to control the impulse to eat? The second approach seems too simplistic, as new research confirms that there are complex and uncontrollable biological, psychological, and environmental factors that contribute to obesity and its frequency its society.

Research has supported the notion that obesity has biological causes. In a study conducted by Dr. Michael W. Schwartz, Dr. Shwartz investigated obesity in rats and mice. His study exhibited a correlation between injury to a specific part of the hypothalamus, and obesity (Wood, 2012). Shwartz's study is referring to the ventromedial hypothalamus, which, when stimulated, causes people to stop eating. However, when this structure is damaged or destroyed, organisms will not be able to stop eating and become obese.

According to the "thrifty gene

hypothesis," natural selection has also impacted obesity (2010). For the majority of human history, famine, not obesity, was a prevalent problem. Survival was more likely for those who were able to store fat in their bodies more efficiently, and avoid starving to death. These people were more likely to reproduce, and pass "those 'fat-storing,' 'metabolism-slowng' genes down to their children, who had a better chance of surviving and reproducing as a result" (Shuldiner). Accordingly, those who "surviv[ed]" stored more fat in their bodies, leading to the vast obese population today. Additionally, genetics have a major impact on weight. According to the set point theory, one's weight fluctuates around a set point, and based on his or her fat intake and energy output, metabolism keeps weight fixed around this point (Shuldiner). This set point is based on a person's genetics; a set point may be high or low relative to an ideal weight. Therefore, obese people may have a higher set point than those with a healthy weight, thus explaining one possible cause of obesity. Moreover, studies have shown that twins and family members have a more similar bodyweight than adoptees, further revealing a correlation between one's genes and body weight (2010).

Obesity is more than just a health condition; it is a lifestyle, albeit one that most would not choose, that affects the way the afflicted are perceived by others and subsequently how they view themselves. Many are quick to blame the 'couch-potato' syndrome. According to Dr. Jeanne Randolph, a specialist in the field of psychology's connection to obesity and an associate professor of psychiatry at the University of Toronto, "for the chronically obese... inactivity is rarely the sole culprit" (Kreidie, 2000). Rather, there is a "myriad of psychosocial factors that, together with a genetic predisposition, sets the groundwork for excessive weight" (Kreidie, 2000). Dr. Randolph recognizes the situational consistencies in her patients; namely, sentiments of persecution as a result of bullying and exclusion. These actions can be detrimental to the patient's self-esteem on

a long-term scale, no matter what age the abuses occur (young people, however, are particularly vulnerable). Randolph explains that when a person is “singled out as different, they [give] up participating in the ordinary joys of life, [get] into weird diets and severe caloric restriction and set the ball rolling for yo-yo dieting,” all of which provide the grounds for a ongoing cycle of obesity (Kreidie, 2000). Research has shown that this is especially valid for women, who are more likely to have an emotional basis contributing to their obesity than are men.

According to prevalent research in the field of obesity and its causes, there are specific personality traits and behavioral patterns that contribute to weight gain. Angelina R. Sutin, a researcher at the National Institute on Aging, published a longitudinal study in 2011 of 2000 residents of Baltimore, Maryland that confirmed a connection between body mass indexes (BMI's) and personality traits. The study found a correlation between obesity and scoring high on neuroticism and impulsivity and low on conscientiousness and agreeableness. According to Sutin, awareness is the first step. She acknowledges that “If we can understand how personality is contributing to weight gain, we can develop interventions to help people deal with it” (Beck, 2012).

Five overarching personality stereotypes in particular have been labeled in an article by Fox News: the night owl, stress junkie, mindless multi-tasker, giver, and perfectionist. The sleep deprived “have low levels of leptin, the hormone that signals fullness, and drives up ghrelin, the hormone that fuels appetite, particularly for high carbohydrate, high calorie food” (Beck, 2012). Those who are under constant pressure to perform are internally motivated through the release of the stress hormones of cortisol and adrenaline. These hormones put the body on the offensive, into a ‘fight-or-flight’ mode that can exhaust the system and result in overeating. Habitual busy-bodies also have a proclivity to be obese; the multitude of activities that are simultaneously performed can lead them to overlook how much they are eating and ignore the body’s fullness signals (an example of such is eating while watching television). Givers are defined as those who “constantly put other

people’s needs ahead of their own;” this takes a toll on one’s emotions and food becomes a source of solace (Beck, 2012). There is a link between perfectionism and obesity; the food serves as a controllable factor. Through manipulation, whether it is over or under eating, the perfectionist retains a feeling of control that may not be achieved in other areas of his life. These ‘likely’ vulnerabilities not only spur overeating, but perpetuate the habit.

Furthermore, research suggests that certain foods can become extremely addictive resulting in obesity. (Sack, 2012). Certain foods affect the “reward circuitry” in the brain, leading to addiction. Primarily, people can develop a tolerance to sugar, and need larger quantities to feel pleasure (Sack, 2012). Princeton Psychologist Dr. Bartley Hoebel proposed that drugs, as well as sugar intake are regulated by the three phases of addiction: binge, withdrawal, and preoccupation. A Yale study mentioned in a Psych Central report demonstrates this addiction, stating that “brain activity of women with three or more symptoms of food addiction that viewed images of and then drank a chocolate milkshake was similar to drug addicts. Just as drug addicts’ brains light up when viewing drugs or drug paraphernalia, food addicts’ brains light up in the areas governing pleasure and reward when looking at high-fat foods and show reduced activity in regions involved with self-control when actually consuming those foods,” such as the pre-frontal cortex (Sack, 2012). This research indicates that controlling food addiction activates the same parts of the brain that controlling drug addiction does, indicating the severity of food addiction. One’s environment can lead to intense food addiction, thereby changing the functioning of one’s brain and exacerbating or initiating obesity.

Living conditions also influence how vulnerable one is to obesity. People who have lower incomes tend to live in “neighborhoods with lots of fast food and convenience stores, but few grocery stores, [that have] much higher rates of obesity and diabetes” (Fudge, 2010). Since health food is costlier than manufactured food, many low income individuals must resort to fast food. Jim Sallis, a psychology professor at San Diego State, said in a study that people who live

in poor neighborhoods may not want to take walks because of a lack of “aesthetics” and low quality sidewalks and parks (Fudge, 2010). This will lead to a lack of exercise, which makes it very difficult to maintain an average weight. Ultimately, living conditions impact food intake and exercise and can eventually lead to obesity.

The pressures of everyday life, whatever they may be, are overwhelming. When these occur, it is not uncommon to turn to food as a source of comfort. This is somewhat ironic as obesity can be the primary source of the problems and stress for the afflicted, affecting one’s health, self-esteem, physical appearance, relationships, and overall satisfaction with life. The problem begins when reliance on food becomes a continuous habit; a metaphorical crutch. The obese slowly lose control of their ability to say no, like with any potentially addictive substance. The food provides immediate, yet ephemeral, gratification. Once the overeating has occurred, feelings of disgust and helplessness surface. Hence begins the cycle of self-hatred and binging that is highly detrimental. As stated by weight loss coach Renee Stephens, “Is there anybody who doesn’t know that broccoli is better for you than a Big Mac;” food is about control, and often, “what’s going on in our heads” relates to what “we’re using the food for” (Beck, 2012). Like with any disease, there is no simple answer to the obesity phenomenon.

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# **Radicalization and the Internet**

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On July 7, 2005, a series of bomb blasts that targeted the London public transport system killed 52 citizens and injured 700 more. The London bombings are an example of terrorist incidents in which the attackers were raised in a westernized culture and were seemingly innocuous individuals. According to a report prepared by the New York Police Department, the four bombers, Mohammad Siddique Khan, Shehzad Tannweer, Hasib Hussain and Germaine Lindsay were well integrated to society and all experienced secular upbringings. In fact, three of the four bombers were second-generation British citizens of Pakistani descent and came from well-off families. Mohammad Siddique Khan was a married man, a father, and a graduate from the Leeds Metropolitan University who went by the nickname of “Sid” (Silber & Bhatt, 2007). Shehzad Tanweer was a graduate of the Leeds Metropolitan University as well who came from a well-to-do family and owned a valuable estate (Silber & Bhatt, 2007). The backgrounds of these four demonstrate that it is very difficult to recognize potential terrorists based on their adherence to predetermined schemas. The lack of a profile for terrorism is a great obstacle for anti-terrorist experts. What experts have attempted to do, instead, is to identify the path that individuals take towards becoming a terrorist.

In the past half century, the threat of international terrorism has grown rapidly due to more sophisticated technology and the concentration of war in the Middle East. Since September 11, “analysts and public officials have expressed growing concern about the potential of Muslim citizens and residents of the United States to plot attacks within the country’s borders” (Brooks, 2011). This phenomenon is commonly referred to as “homegrown terrorism” and is a threat to many western nations including the United Kingdom, Canada, and Spain. This paper will explore the psychological motivations and causes behind the “jihadization” process of citizens raised in western cultures and

the important role that the internet may be playing.

### **Process of Radicalization**

The word Jihad is literally translated to “struggle or effort,” but Muslims use the word as it pertains to three specific types of religious struggle (BBC, 2003). The first is the believer’s internal struggle to live through the Muslim faith, the next, to uphold society by Muslim law, and the last is the struggle to defend Islam, “with force if necessary” (BBC, 2003). In the last ten years, a number of terrorist attacks have been instigated not by individuals from traditionally Muslim countries but by people who seek to “attack their country of residence, utilizing al-Qaeda as their inspiration” and focal point (Silber & Bhatt, 2007). These individuals see Jihad as a struggle to defend Islam against Western influence.

It is important to understand the way people access information that inspires them to get involved in terrorist activity. The New York Police Department composed a report in 2007 discussing the stages an individual undergoes on the road to full “jihadization” and the sources one can draw from when trying to get involved in terrorist organizations (Silber & Bhatt, 2007). Though the report does not specifically refer to homegrown terrorism, its findings are generalizable.

Stage one, “pre-radicalization,” is the person’s environment, their “pedigree, lifestyle, religion, social status, neighborhood, and education” that prelude the transition to jihad involvement (Silber & Bhatt, 2007). As noted before, these individuals are not distinguishable from their peers and often live comfortable lifestyles. Attempts to identify individuals in this stage who are likely to turn radical are generally unsuccessful.

Stage two, called “self-identification,” is the point where an individual starts to explore the possibility of extremism, most closely associated with Salafi Islam, and migrates away from their former identity (Silber & Bhatt, 2007).

This stage is usually preluded by a catalyst, a “cognitive event, or crisis, which challenges one’s certitude in previously held beliefs, opening the individual’s mind to a new perception or view of the world” (Silber & Bhatt, 2007). The “self-identification” stage is particularly resonant with western Muslims because they are, by default, more prone to identity crises. An individual searching for their identity may be doing so because of a recent dramatic change in their life such as a loss of job, death of a friend or family member, or social alienation. In the 2005 London attack, bomber Germaine

Lindsey was already deviating towards Islamic ideals and spending time at “extremist” hubs when his mother moved out of London to the U.S. to live with another man. This event “[can be] described as a traumatic experience for Lindsey, for which he was ill equipped and may have pushed him towards seeking solace and support in the Salafist mosque” (Silber & Bhatt, 2007).

Once a person develops an interest in extremist subculture, they usually strive to communicate with others who feel the way they do by connecting with similar individuals near them. A 2005 bombing in the London Underground involved four men, three of whom came from Leeds, where more than 10% of the population are Muslim from a region in India known as Kashmir (Silber & Bhatt, 2007). All four men were described as being “well integrated into British society” and “Westernized” by their families, but ended up as suicide bombers. The mosques, clubs and gyms the men frequented with other Muslims were effective “incubators” of their radicalization processes and the closeness of these communities likely intensified the men’s feelings about their cause and the drive behind the attack. Any individual who becomes more inclined to the conservative interpretation of the Qur’an such as Salafi Islamists, experiences social and familial alienation, and gives up western activities can be seen as progressing to the final stage, “jihadization”.

The third stage, dubbed “indoctrination,” is the stage characterized by an individual’s conclusion that the “conditions and circumstances exist where action is required to

support and further the Salafist cause” (Silber & Bhatt, 2007). Indoctrination acts as a final step before any militant action that the individual takes. This stage is marked by an individual’s departure from a mosque, the place that once served as an incubator of Muslim thought but will no longer “meet the individual’s radicalization needs” (Silber & Bhatt, 2007). The individual in this stage is interpreting world events as a clash between the believers of Islam and the non-believers and they world events as they unfold, hold personal meaning. Effectively, this stage marks the conclusion of the person’s cognitive transition; the next step is action.

Finally, “jihadization” refers to a person’s final phase “in which members of the cluster accept their individual duty to participate in jihad and self-designate themselves as holy warriors or mujahedeen” (Silber & Bhatt, 2007). They will either form groups and plan attacks, or individually plan attacks. This is a unique phase because, while the previous three may take years to complete, “jihadization” phase can take less than a few months to complete.

### **The Internet and Home Grown Terrorism**

Group polarization is a psychological concept describing the phenomenon that “deliberation tends to move groups and the individuals who compose them, toward a more extreme point in the direction indicated by their own pre-deliberation judgments” (Cass, 1999). In terms of home-grown terrorism, this concept may serve to explain the effects of jihadist and pro-extremist chat rooms and websites on individuals in the process of “jihadization.” Particularly in today’s society, the internet is a vital, ever-evolving resource that “is nearly impossible for someone to avoid” if they are searching for more information about extremism (Silber & Bhatt, 2007). For individuals in the “indoctrination” phase, the Internet “becomes a virtual ‘echo chamber’—acting as a radicalization accelerant while creating the path for the ultimate stage of Jihadization” (Silber and Bhatt, 2007). In 2008, The U.S. Senate Committee on Homeland Security and Government Affairs published a report entitled “Violent Islamist Extremism, The Internet, and the Homegrown Terrorist Threat.”

According to the report, al-Qaeda and other extremist, violent organizations “produce content consistent with the core terrorist enlistment message,” a sophisticated way for groups to spread their messages (Lieberman & Collins, 2008). Leaders of these groups utilize video broadcastings and personal statements from suicide bombers. Al-Qaeda, the largest mobilized Islamic terrorist organization, associates itself with several “production centers,” at which their propaganda is released and broadcasted to the public in the form of online magazines, official statements, news updates, articles, white papers, and even poetry (Lieberman & Collins, 2008). In most cases, gaining access to this information is not a tricky feat – by simply surfing the web and searching a few key words, an individual can obtain information and opinions that may strengthen his own. In some cases, chat rooms appear in lieu of extremist mosques, community centers or even coffee shops where extremist talk and behavior was condemned (Lieberman & Collins, 2008). While chat rooms are much harder to access than web sites, they provide complete anonymity and extreme polarization, because dissenting views are not tolerated and discussion topics are also monitored and restricted (Lieberman & Collins, 2008). Both chat rooms and interactive websites are avenues down which an individual can travel if they desire information and even interaction with fellow “jihadists.” As long as the internet continues to exist and flourish, interested members of society will have access to ideas that may lead them toward taking destructive action.

The Toronto 18 extremist plot of 2006 stands as an example of online ‘jihadization’. In June of 2010 Steven Chand, Asad Ansari and Fahim Ahmad were brought to trial for their alleged participation in a homegrown terrorist plot. Hundreds of hours of taped phone calls and conversations recorded by a police mole revealed that the terrorist group had intended to build an arsenal of weaponry and to attack both an Ontario nuclear power plant and the Canadian Parliament in Ottawa (Gillespie, 2010). In addition to finding details about the plot, the U.K. police were also able to trace the group back to its origins. Upon arresting one young man, Aabid Khan, an al-Qaeda supporter and recruiter living

in England, the U.K. police discovered a network of chats between Kahn, Fahim Ahmad, and other members of the Toronto 18. They found that these men had first met in an Internet chat room called Clear Guidance in 2003. It was there, on a site frequented by alienated young Muslim men, that the leader of the group, Ahmad, had posted over 700 messages and had become deeply involved in plotting acts of terrorism (Gillespie, 2010).

Considering the rate at which online tools such as chat rooms and websites are becoming more prevalent in terrorist activities, the threat of terrorism spread by the internet is greater than ever. These tools allow isolated individuals, living primarily in non-Islamic countries, to explore the jihadist world and communicate with others who may be contemplating or who support jihadist action. With access to varying degrees of opinions and stances on Muslim extremism, interested individuals can unwittingly expose themselves to the dangers and risks of unlimited interactions with extremists searching for potential recruits. By understanding the burgeoning threat associated with terrorism facilitated by the internet, it is possible to use the evolved technologies to locate and convict both recruiters and “jihadized” individuals.

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# **Long-Term Effects of Abuse**

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Every day in the United States more than five children die as a result of neglect or abuse. Approximately 80% of these children are under the age of four. Abuse affects individuals in every socioeconomic level, across all ethnicities and cultures as well as all religions and levels of education. Individuals subject to such relationships suffer variously, depending on the way in which such effects manifest themselves. The short-term effects are evident but the effects of abuse reach past childhood and can impact victims for the rest of their lives. Victims of abuse are 25% more likely to experience teen pregnancy, 59% more likely to be arrested as a juvenile, and 30% more likely to commit violent crime (ChildHelp). The effects reach beyond the teenage years and into victims' adult lives. About 80% of 21 year olds who were abused as children meet the criteria for at least one psychological disorder and 30% of abused and neglected children will later abuse their own children. They are also 28% more likely to be arrested as adults (ChildHelp). The impact is also significant for abused adults. This paper discusses the psychological, social and economic effects of domestic abuse and analyzes a theory that illuminates the reasons adult women remain in such abusive relationships.

### **Psychological Disorders**

Among other psychological disorders, Post-Traumatic Stress Disorder and Dissociative Disorders are prevalent among individuals abused during childhood. Though there is a correlation between PTSD and Dissociative disorders, there are important distinctions. The onset of PTSD can occur during childhood or later in life. The symptoms include "frequent memories or talk of the traumatic events", "bad dreams", "fear of dying", "loss of interest in activities", "headaches or stomachaches", "extreme emotional reactions", "trouble sleeping", "irritability, anger, violence", "difficulty concentrating", and constant or frequent "clingy or whiny behavior and regression to a younger age" (Babbel,

2011). Research has demonstrated that females are more likely than males to develop PTSD as a result of childhood abuse. However, certain factors can also play a role in whether individuals will develop this disorder. Among these factors are an individual's innate ability to cope, the degree of perceived threat, the relationship between the victim and the abuser and the personal support system available to the victim on a day to day basis. Some professionals have theorized that younger children are at higher risk for long-term PTSD because they are less likely to understand their situation and its implications. It has also been speculated that children who feel guilt or responsibility for their abuse may tend to increase the prevalence or severity of PTSD (Babbel, 2011).

Dissociative disorders also appear frequently in individuals who were abused as children. In fact, the most common cause of dissociative disorders is severe, repeated physical, sexual and/or emotional abuse. Most people with dissociative disorders also suffer from PTSD. Research has suggested that those with such trauma disorders are more likely to develop "serious medical issues, substance abuse problems and self-harming behaviors" (2009). Dissociation is an individual's cognitive separation between his or her "thoughts, memories, feelings, actions or sense of who he or she is" (2009). Dissociation can manifest itself in benign behaviors like daydreaming, getting lost in a book or any cognitive incident in which one loses a sense, however temporary, of his or her surroundings are examples of dissociation. However the more severe dissociative disorders such as amnesia and dissociative identity disorder are thought to be a survival mechanism. Dissociation provides relief to the subject from an intolerable situation, one with which he or she may have difficulty coping. Instead of dwelling on and being consumed by the feelings of horror, fear and pain, the individual can mentally escape. This can also lead to a form of amnesia where the dissociated personality bears the memories of traumatic experiences that the individual has suffered. Though thought to be a coping mechanism, dissociation can also have negative implications.



In the long-term, dissociation can disrupt an individual's sense their identity and history. If dissociation becomes more frequent, it can result in "serious pathology, relationship difficulties, and inability to function, especially when under stress" (2009). Like PTSD, dissociative disorders are more common in women. However, recent research has suggested that these disorders may be just as common in men however less frequently diagnosed. Men with these disorders may also suffer from other mental illnesses or substance abuse (2009).

These disorders are serious and demonstrate the severity of the long term effects of abuse. Not only may a child have physical or emotional scars in the short term, but may also be damaged psychologically in the longer term.

## **Social Issues**

Victims of childhood abuse may also struggle socially. One of the reasons for these difficulties is a low self-esteem. One study found that those who were abused as children tended to suffer from low self-esteem (Roberts, 2003). The study also found that those who tested low for self-esteem were usually involved in unfulfilling relationships than those who tested higher. A possible reason for this is that individuals who were abused as children attempt to recreate such an environment as adults. Due to the unhealthy environment where they were raised, they may not be able to understand or recognize the warning signs of abuse in their current relationships. Another reason that individuals abused as children may be in unfulfilling relationships is the personality traits that have developed from such abuse. They tend to be impulsive, temperamental, stubborn, demanding, and rebellious. They have difficulty controlling their emotions and feelings. Such characteristics are disadvantageous when developing and entering into an intimate relationship. Abused individuals may not be able to empathize with others which may lead to difficulty analyzing social situations. As a result individuals who were abused tend to be shy and withdrawn. Former victims may also be less trusting and more suspicious of those around them. If they did not grow up being exposed to productive and healthy problem solving in relationships,

they may not have the necessary skills to resolve conflicts in their adult relationships. They also may have issues communicating with their partner and cooperating with their partner as a parent. As a result, victims of childhood abuse report higher levels of marital conflict (Roberts, 2003).

These findings seem to indicate that childhood environment and relationships seem to have an impact socially on victims. Particularly, abusive relationships can damage a child's immediate and future ability to have functional relationships.

## **Economic Effects**

While abusive relationships are often physically and emotionally tolling, the effects are far more extensive than that; they often have serious economic repercussions as well. As a result of the physical abuse, the victim may find that he or she is repetitively absent from work, and is thus unable to fulfill his or her responsibility as an employee. On an emotional level, the victim may feel withered, dejected and isolated, and lose the motivation to consistently come to their job. Even if the victim shows up, he or she may be too weak and depressed to competently finish his or her work. This lack of commitment will often result in the victim being fired and thus economically unstable. Additionally, "Abused women may have to move house repeatedly to escape from their abuser; this is not only expensive, but it makes continuity of employment impossible" (McAtee, 2010). Being unable to maintain a proper job prevents the victim from gaining independence and emotional strength in order to fight the abuser; this often pushes the victim mercilessly back into the abusive relationship for financial security, unable to escape.

## **Social Cycle Theory**

The Social Cycle Theory crafted by Lenore Walker dictates that often, abusive relationships follow a cyclical, battering pattern. The theory helps illuminate the complex intermingling of loving gestures with abusive behavior that defines many these relationships. Walker's theory dictates that "without intervention, the frequency and severity of the abuse tends to increase, spiraling the



couple downward in the cycle of abuse” (Walker, 2010). The cycle is defined by three phases: tension, crisis and calm. The first phase, tension, is the longest of the three, lasting from weeks to months. During this phase, the violence is at a minimum, but the victim anticipates growing danger, which results in diminishing communication between the partners. During this phase the victim often goes through denial, and attributes the abuse to external factors; this creates a sense of hope in the victim, that the abuse is temporary and will eventually stop. The second phase, crisis, with the shortest duration, lasts variably from a few hours to a few days. During this time, the abusers behavior peaks to a volatile level, until he or she snaps and uncontrolled violence occurs. The chance of severe or fatal injury increases, and the abuser blames the victim for their given circumstances. The victim may respond to the abusers in one of which ways: by accommodating in order to survive, by escaping then returning when the crisis has ended, and by collapsing emotionally (Walker, 2010) . Lastly, during the Calm Phase, the abuser seeks lovingly and apologetically for forgiveness, while making many false promises. The victims, who is at this point worn down, feels relieved, forgives the abuser, and is re-instilled with a sense of hope. However, these feelings of optimism are short-lived, as this phase usually lasts for only a few days or weeks before the pattern repeats itself once again.

With 3.3 million reports of abuse involving 6 million children every year and an average of over five deaths a day, the U.S. has one of the worst abuse records among industrialized nations (ChildHelp). Further, for every one incident of child abuse or neglect, it is estimated that two incidents go unreported (2010). This is especially significant considering that the effects extend well beyond childhood incidences of abuse. Such difficulties can manifest themselves economically, socially, psychologically and cyclically. Due to the severity of both short and long term consequences, policy-makers and the public should work toward preventing abuse and treating the resulting issues.

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