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Knowledge and Attitudes About Twins
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Chapter I
Review of the Literature

Twins

Twins are two children who are the product of one birth (Hine, 2009). Twins are the most frequent type of multiple births (TWINS Research, 2011). According to the Center for Disease Control and Prevention (CDC, 2008), there were 138,660 twin births in 2008 in the United States, or 32.6 of 1,000 births. There are currently approximately 4.5 million individuals who are twins living in the US, comprising about 2% of the general population (The Twins Foundation, 2009). The number of twin births in the United States (along with other multiple births) is on the rise (The Twins Foundation, 2009). According to the National Center for Health Statistics, the birth rate for multiples in the US rose 28% between 1990 and 1998 to 29 births per 1000 (TWINS Research, 2011). Pinborg, Loft, Schmidt and Andersen (2003) attribute the increase in twin birth rates to factors such as the increasing age of mothers, In-Vitro Fertilization and ovarian stimulation, and other forms of fertility treatments. In the United States, a woman’s chance of having twins is about one in 90 (The Twins Foundation, 2009).

There are two main categories of twins: identical and fraternal, although more recent findings suggest that the classification of twins may be more complex than this dichotomy. Identical (monozygotic or MZ) twins result from one fertilized egg dividing into two separate, genetically identical eggs (Hine, 2009). Fraternal (dizygotic or DZ) twins are the result of two eggs that are fertilized simultaneously and can be either same
sexed (SSDZ) or opposite-sexed (OSDZ) (Hine, 2009). Fraternal twin births account for
two-thirds of all twin births, with the occurrence of male-female fraternal twins (OSDZ)
and same-sexed fraternal twins (SSDZ) equally represented (Twins Foundation, 2009).

**Myths about and conceptualizations of twins**

Throughout history, twins have been a topic of interest, often serving as the basis
of myths and cultural rituals. In some cultures, such as the Northwest North American
Indians, twins are viewed with fear and are believed to be a bad omen (Pector, 2003). In
other cultures, like the Yoruba of Nigeria, twins are revered as divine (Stewart, 2000a).
The Nkundu of Central Africa believed that twins must be treated identically or else the
slighted twin would die (Pector, 2003). Regardless of individual culture’s views of twins,
these societies use rituals, myths and legends to either cope with or make sense out of
twin births and how twins were conceived. For instance, the Sumba of Indonesia believed
that twins shared one soul and ritually separated twin souls if one twin died as a means of
preventing the death of the surviving twin (Pector, 2003). The myth of Castor and Pollux
serves as an example of a common story of the origin of twins; in this case, it involves
twins being fathered by two different men, one mortal and the other immortal. This story
also includes the theme of the twin “bond” and mutual devotion: after Castor is killed,
Zeus offered Pollux immortality, but he declined because he wanted to share his
immortality with his brother. Zeus granted this request and transformed the brothers into
the Gemini constellation (Gehman, 1970).

Both Stewart (2000a) and Bacon (2010) contend that because a typical birth
involves one baby, twin births are an anomaly to this process. Therefore, cultures are
forced to handle twin births differently and make sense of them in different ways (Bacon,
2010). One way of doing this is through myths. Although empirical literature on twins has become more prolific in recent years, myths and rituals related to twins have existed for hundreds of years. Myths, in general, are socially constructed and socially significant. Some myths are used as explanations to account for events or phenomena that are difficult to explain (Cohen, 1969). For example, the story of twins Romulus and Remus is used to explain the creation of the Roman Empire. Myths that are related to social structures allow for systems and institutions to be viewed as normative or morally appropriate (Tyler, 2006). Stewart believes that identifying and interpreting myths about twins is a good way to gain information about the social roles twins play and ways in which they have been conceptualized, both positively and negatively.

There are also modern myths about twins. Pearlman and Gannon (2000) authored a book for parents with information about raising twins that included a chapter on myths about twins. The inclusion of this chapter suggests that understanding society’s beliefs about twins (whether accurate or inaccurate) may be helpful for both twins and their parents as they encounter and attempt to cope with some of the unique aspects of twinship such as being frequently compared to a co-twin, receiving extra attention because of being a twin, struggling to form an individual identity, and answering questions based on commonly misunderstood features of twins.

The role of twins in research

Twins have played an important role in scientific research, as twins (especially identical twins) provide a means to study difficult to research processes in medicine, psychology, sociology and human development. The use of twins in research is often referred to as the “twin method” and the creation of this method is attributed to the work
of Sir Francis Galton (Smilansky, 1992). Galton viewed twins as the key to
distinguishing between the effects of heredity and later life experiences (Stewart, 2000b).
Often, twin research focuses on the genetic similarities of twins and how these
similarities might help in understanding or supporting various sides of the nature-nurture
debate. Specifically, concordance, when both members of a twin pair experience a
particular phenomenon (such as disease, personality style, or intelligence), is assumed to
be related to genetic causes whereas discordance, when only one member of a twin pair
manifests a particular trait or behavior, is assumed to reflect environmental influences.

The vast majority of systematic research on twins has focused on abnormal or
pathological aspects of adjustment, often whether or not both twins will express a
particular pathology. These findings are then interpreted in one of two ways: as support
for the view that genetics are the primary factor in pathology development, or as evidence
that pathology is more complex than genetics alone. In contrast, there has been little
research on non-pathological features of twin development or an examination of the
effect of social expectations placed on twins, although there are a plethora of books and
popular articles about twins, the twin experience, and advice about raising twins. More
recently, interest has increased in the study of twins for the sake of studying their unique
experiences, and identifying risk and protective factors for twins.

**Twins and psychopathology**

Many children grow up with siblings. Twins, however, have the unique
experience of growing up with someone who is their same age and with whom they, in
many instances, share many of the same experiences (Thorpe, 2003). This unique status
also seems to carry special social expectations. While myths and stories of twins are
abundant, there is little research on healthy development of twins. Rather, most literature on twins focuses on identifying or explaining factors that contribute to twin psychopathology (Beauchamp & Brooks, 2003; Pearlman, 2001; Thorpe, 2003), which is assumed to occur at a higher rate than among singletons.

Zazzo (as cited in Robin & Casati, 1994) proposed that twin psychopathology is attributed to the bond between a twin pair. The twin bond is defined as a close connection between twins that may hinder their social adaptation because it isolates them from the outside world (Robin & Casati, 1994). Zazzo described the relationship between twins as similar to that of a romantic couple. He believed that the twin couple was so close that it became less important for twins to communicate with others, resulting in both delayed language development and problems with self-recognition. Delays in language development are supported by systematic study, although the mechanisms that account for this delay are not well understood. Thorpe (2006) conducted a literature review of studies that measured twins' language development (6 studies total). She concluded that twins (particularly boys) have an increased risk for mild delay in language development. Thorpe posited that twins seem to be more sensitive to factors that impact language development.

According to Thorpe (2003), a raised risk for psychopathology in twins has not been established empirically. However, researchers continue to focus on this issue, which has been called the psychopathology hypothesis. This hypothesis is divided into two camps, the biological hypothesis and the social hypothesis (Thorpe, 2003).

The biological hypothesis of twin psychopathology is based on the assumption that twins are biologically different from singletons (Rutter & Redshaw, 1991). Twins,
MZ twins in particular, have a higher rate of congenital abnormalities as well as perinatal and obstetric complications compared to singletons (Rutter & Redshaw, 1991). Supporters of the biological hypothesis believe that increased risks both before and after birth contribute to later psychopathology (Thorpe, 2003). These risks include greater risks to twins in the pre- and peri-natal environment that are hypothesized to predispose twins to subtle neurological damage that is believed to account for psychopathology among twins (Rutter & Redshaw, 1991; Thorpe, 2003). According to The Twins Foundation (2009), premature birth is a major reason that twins and other multiples have higher incidence of birth defects and neonatal death. In fact, twins and other multiples account for almost 20% of infants born at extremely low weights (The Twins Foundation, 2009).

The social hypothesis of twin psychopathology is based upon the assumption that the normal processes of social interaction are interrupted and altered for twins (Thorpe, 2003). Particularly during early life, twins are frequently in the presence of their co-twin and may be forced to share valuable resources, such as attention from parents (Robin & Casati, 1991; Thorpe, 2003). Some researchers believe that a disadvantage of twinship is the inability for twins to develop as unique, independent individuals (Polderman, Bartels, Verhulst, Huizink, Beijersveldt & Boomsma, 2009). Additionally, parents of twins may be under increased stress and may experience more depression, which in turn might affect the way twins are raised (Thorpe, 2003). The Twins Foundation (2009) reported that twin individuals are nine times more likely to suffer from abuse, neglect, physical disabilities, delays in speech and language development, and social and emotional maladjustment than their singleton peers.
When twins are young, there are few opportunities for them to interact socially with others without their twin present and they frequently share friends (Thorpe & Gardner, 2006). Thorpe and Gardner contend that because twins establish their childhood friendships in the presence of their co-twin, when they present themselves in social settings, they present both their own identity and their couple or twin identity. According to Preedy (2001), twins are forced to strike a balance between their individual identities and their identity as a couple. As a result, when twins develop significant relationships with others, it is usually a relationship that involves their co-twin also (Kozlak, 1978). In addition, because twins have both individual and couple identities, others may assume that they share a single social personality and consequently can be treated the same way (Danby & Thorpe, 2006; Thorpe & Gardner, 2006).

Another hypothesized contributor to twin psychopathology is that twins’ closeness causes them to be disadvantaged because they will be less inclined to interact with other children and therefore will be limited in opportunities to engage in social contacts as individuals (Pearlman, 2001; Rose, 2002 as cited in Nilsson, Barazanjia & Simeone, 2010). Kozlak (1978) reported that twins are more likely to experience confusion and conflict related to their twin relationship and closeness. The belief that twins experience these conflicts seems to play a role in the determination of whether twins should be in the same classroom in school. This is a belief that has not been supported empirically; in fact, some researchers suggest that being in the presence of a co-twin may serve as a buffer to psychic trauma (Pearlman, 2001; Sheerin, 1991).

**Twinship is a positive factor**
The converse of the psychopathology hypothesis of twinship is referred to as "the adaptive hypothesis" (Pulkkinen et al., 2003). According to this hypothesis, the uniqueness of the twinship experience may serve as an enhancement to twins' social development (DiLalla, 2006; Pulkkinen et al., 2003). In an attempt to measure twins' social and behavioral adjustment, Pulkkinen et al. compared twins who were gender-matched to their singleton classmates on peer ratings of behavioral adjustment. The sample included 1,874 Finnish twins who were 11 to 12 years old (687 MZ, 610 SSDZ, 577 OSDZ) and 23,000 non-twin classmates. Participants completed a 30-item peer-nomination inventory that contained factors such as adaptive behaviors, externalizing behaviors, and internalizing behaviors.

Overall, participants rated twins higher than gender-matched singletons on a measure of adaptive behaviors (compliance, socially active behavior, constructive behavior) (Pulkkinen et al., 2003). This result was particularly significant for OSDZ twins related to items measuring popularity, social interaction and leadership. There was no difference between twins and singletons on externalizing or internalizing problem behaviors. Additionally, no significant difference was found between MZ and SSDZ twins. Pulkkinen et al. contend that these findings support the notion that twinship is a positive developmental factor, particularly for twins who are OSDZ. This may arise from twins' higher social and cooperative behaviors that result from their need to learn how to share and interact with a same-aged playmate more than singletons (DiLalla, 2006).

DiLalla (2006) conducted two studies that compared twins to singletons on measures of prosocial behavior and aggressive behavior. The participants were five-year-old twins (n=91) and singletons (n=152) who were observed in a play situation with an
unfamiliar, same age, same sex peer. The participants were then rated on dimensions of prosocial and aggressive behaviors. There was no significant difference in aggressive behavior between twins and singletons, but twins displayed significantly fewer prosocial skills such as complimenting another child, offering a toy to play with, initiating an interaction, or volunteering to help another child. Additionally, there was no significant difference between the behaviors of MZ and DZ twins raising the possibility that something unique to the twin situation plays a role in twins demonstrating fewer prosocial behaviors.

In a follow-up study, DiLalla (2006) used parental ratings of ninety-eight 10- to 15-year-old twins and 84 singletons to evaluate possible differences between twins and singletons on prosocial and aggressive behaviors. In this study, parents rated twins as significantly more aggressive than singletons, but there were no differences in parents' ratings of prosocial behavior. DiLalla (2006) interpreted these findings as suggestive that twins are more likely to have poorer social interactions than singletons in early and middle childhood. This suggests that twins might be at risk for difficulties with prosocial behaviors early in life and problems with aggressive behaviors as teenagers. These findings underscore the importance of understanding what it means to be a twin. While the majority of research and writing on this topic has been through the eyes of twins themselves, it would be useful to understand how non-twins think about twins in general.

**Western Conceptualizations of Twinship**

Bacon (2010) argues that Western cultures’ notions of twinship are based on three interrelated characteristics: sameness, togetherness and closeness. The characteristic of sameness refers to the assumption that twins are physically similar (Bacon, 2010). This
implies that the only way to differentiate between twins is by their clothing or cosmetic preferences. The assumption of sameness may account for some of the current popularity of twins and society’s apparent obsession with twins looking and acting identically. It seems that when individuals see two people who look very similar, they expect that these individuals will have the same personality and psychological makeup, as if physical similarity implies psychological similarity as well.

As Bacon (2010) points out, in the United States there are television shows about twins, such as *Sister-Sister* (Coston, De Passe et. al, 1994) and *Suite Life of Zach & Cody* (Kallis, Dreayer, O'Connell & Geoghan, 2005), festivals for twins (the annual Twins Festival in Twinsburg, Ohio), and media reports about twins, all of which place a heavy emphasis on sameness and extreme displays of twinship. For example, at the Twins Festival, contests are held for the twin pairs that look the most alike and festival attendees are encouraged to dress like their co-twin, so they can participate in the “Double Take Parade” (Twins Days Festival, 2011).

Depiction of twins in literature and the media is not a new phenomenon. According to Smilansky (1992), the first play about twins was written around 190 B.C. This play, which has not been seen for centuries, is reported to have influenced Shakespeare’s *Twelfth Night* and *The Comedy of Errors* (Shakespeare & Howard, 1995), both of which involve mistaken identity of twins. These comedic displays of twins being confused with each other continue to be popular (Bacon, 2010), as reflected in the popularity of movies such as *The Parent Trap* (Block, Crane, Shyer & Meyers, 1998), in which identical twin girls switch places in an attempt to reunite their divorced parents.
Sameness is also regularly used by advertisers who capitalize on twins’ identical appearance to market products like shampoo and bubble gum (Bacon, 2010). One popular and well known commercial depicted the “Doublemint Twins” (William Wrigley Jr. Company, 2010) who looked and acted identically to promote Wrigley’s slogan, “Double your pleasure, double your fun.” In fact, the use of twins in media is so common that there are guidelines available for screenwriters interested in using twins in their work. According to Hamlett (2010), the author of one set of guidelines, themes and formulations of twins in literature, movies and books are similar to early Greek and Roman mythology, in that the plot devices used by creators remain unchanged. Hamlett posits that the following plots involving twins are recurrent: good vs. evil twins, twins separated at birth, twins trading places, twins who are close, and twins imitating life.

Bacon (2010) asserts that society’s obsession with sameness leads people to have trouble viewing fraternal twins as twins. The concept of twins looking different is often presented as so ridiculous that it is humorous. This is evidenced by the movie Twins (Gross, Kahn, Medjuck, Webb & Reitman, 1988) in which one twin is a tall, muscular, successful man, while the other is an unattractive person of short stature and limited personal and professional success (Bacon, 2010; Stewart, 2000b). Twins who are opposite sex are often portrayed with emphasis on their similarities (Bacon, 2010). For example, they are often shown wearing similar clothes, but in different, gender typical colors. Bacon (2010) contends that the children’s physical similarity highlights their twin status, while the clothing color is used to show they are of different genders.

Myths, stories, movies, plays and television shows depict common themes about twins’ relationships and experiences, but there has been limited systematic study of
twins’ experiences. The notable exception is the work of two researchers and sociologists, Stewart (2000a & b) and Bacon (2006 & 2010) who have conducted qualitative studies on the twin experience and have also written books on this topic.

Stewart (2000b) utilized qualitative research methods to examine non-twins’ perceptions of twins. She used two samples: members at a conference on twins and the general public. The first sample was comprised of 100 individuals who were attending a conference in Britain held by the Twins and Multiple Births Association (TAMBA). The majority of the sample was mothers of twins, with the rest being siblings, grandparents, or fathers of twins. These participants were given a two question interview in which they were asked: “When you tell people you have twins, what is their reaction?” and “Once people knew you had twins, what was their first question to you?” (pp. 119-120). The second sample was comprised of 302 people who were stopped in public areas in London and Oxford, England and questioned. Attempts were made to obtain a balanced representation of both genders, resulting in a non-random sample. These participants were asked, “What are the first three things that come to your mind when you hear the word twins?” (p. 119).

Of the 198 total responses to the first question asked at TAMBA, 111 (56%) were categorized as positive (Stewart, 2000b). Many of the 87 negative responses tended to be empathic to the parents’ situation (e.g., “better you than me”). There were 106 responses to the second question, 84% of which indicated that the first question people asked parents’ of twins was whether or not the twins were identical. Less frequently cited responses (under 10% each) were related to gender, temperament, birth order, when the parents found out about the twin pregnancy, and if the twins were “as alike as two peas in
a pod?” (p.121). This supports Bacon’s (2010) contention that society focuses on the sameness of twins.

The street survey resulted in 823 individual responses that were entered separately and then sorted into 122 different categories (Stewart, 2000b). The most common response was “Identical” (24%), followed by “Twins known to the respondent” (20%), babies and children (17%), twins from films (15%), word association (10%) and two (9%) (p. 124). The researchers found that 55% of responses could be categorized as positive or negative; the remaining 45% were neutral (Stewart, 2000b). Of these 55%, 39% were classified as negative and 16% were classified as positive. This reflected a higher percentage of negative responses than were generated by twins’ relatives. Table 1 lists the positive and negative associations.

Table 1. Negative and Positive Associations about Twins

<table>
<thead>
<tr>
<th>Negative Associations</th>
<th>Positive Associations</th>
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<tbody>
<tr>
<td>Lots of work</td>
<td>Bonding/friendship</td>
</tr>
<tr>
<td>Look alike</td>
<td>Lovely</td>
</tr>
<tr>
<td>Same clothes</td>
<td>Wonderful</td>
</tr>
<tr>
<td>Expense</td>
<td>Different personalities</td>
</tr>
<tr>
<td>Identity/Interdependence Problems</td>
<td>I want twins</td>
</tr>
<tr>
<td>Confusion</td>
<td>Special relationship</td>
</tr>
<tr>
<td>Rivalry</td>
<td>Not lonely</td>
</tr>
<tr>
<td>Mysterious/Strange</td>
<td>Nice to be a twin</td>
</tr>
<tr>
<td>Difficulties at School</td>
<td>Fascinating</td>
</tr>
<tr>
<td>Split Personalities</td>
<td>Charm</td>
</tr>
<tr>
<td>Freak circus twins</td>
<td>Observant</td>
</tr>
<tr>
<td>Headaches</td>
<td>Lovely</td>
</tr>
<tr>
<td>Trouble, noise, naughtiness</td>
<td>Salvation for mothers</td>
</tr>
<tr>
<td>I’m glad not to have twins</td>
<td>It’s good luck</td>
</tr>
<tr>
<td>I’ve already got four kids</td>
<td>Wonderful</td>
</tr>
<tr>
<td>Pests</td>
<td>Fun</td>
</tr>
<tr>
<td>Overpopulation</td>
<td>Cute</td>
</tr>
<tr>
<td>Difficult for other siblings</td>
<td>Cooperation</td>
</tr>
</tbody>
</table>

(Stewart, 2000b)
Bacon (2006) conducted a small scale qualitative study to examine the ways in which twins negotiated their identities throughout life. Participants were twins and their relatives, including 10 individual twins from 13 to 17 years old, two twins aged 8, seven twins from 20 to 24 years old, two twins over 30, 15 individual parents of twins and four siblings of twins. Only two of the twin participants were sure of their zygosity, but most believed they were non-identical. Semi-structured interviews were conducted so participants could share their experiences in their own words. Younger participants also were asked to create drawings, respond to vignettes and participate in a self-return task. Interviews were tape recorded and analyzed, as was activity work produced by the younger children. Bacon (2006) used inductive data analysis to generate descriptive and analytical codes and conducted within- and among- code group comparisons in order to evaluate different analytical themes and links between them. The twins who participated commonly reported that they are expected to be close and are encouraged to act the same. Bacon also found that young twins were frequently dressed in identical outfits, or outfits that were very similar, but modified to indicate gender differences in mixed-sex twin pairs. Often, twins reported that they were dressed alike until they objected to being dressed identically (Bacon, 2006).

Stewart (2000a) theorized that the social construct of twinship emphasizes similarity, creating the expectation that twins should look alike and act alike, which implies that twins are copies of the same individual. Indeed, a definition of the word “twin” is “two persons closely related or closely resembling each other” (Merriam-Webster, 2011). A consequence of this emphasis on similarity is that twins should receive the same treatment (Stewart, 2000a). In addition to the expectation of similarity,
Pector (2002) has found evidence that many cultures view twins (and other products of multiple births) as different from singletons. This suggests that the way individual twins are viewed by others is influenced by their twin status. For instance, Kozlak (1978) reported that the twins she surveyed indicated that they were treated as if they were special, or as if they were half of a person. Qualitative research by Bacon (2006) supports this: The twins in her study reported that people treated them as if they were one person and did not view them as individuals (Bacon, 2006).

Several writers (e.g., Bacon, 2010, Stewart, 2000a, Thorpe, 2003) and some qualitative researchers (e.g., Kozlak, 1978) have noted the apparently common experience of twins that they are regularly compared to their co-twin, a phenomenon that Beauchamp and Brooks (2003) refer to as the contrast effect. They postulate that in order to differentiate between twins, people contrast the members of a twin pair in areas like physical characteristics, personality and cognitive differences (Beauchamp & Brooks, 2003). Sometimes these differences can be negligible and highlight very minor differences between the twins. This hypothesized focus on differences between twins is in contrast to the findings of Bacon (2006) and Stewart (2003) that indicate a societal focus on sameness in twin pairs. However, other twin researchers have written in support of the contrast effect. Hay (1999) contends that, from the moment twins are born, people begin trying to differentiate between the pair and determine who is better at what, which twin is more socially competent, is better looking, and so on. It seems that even among twin experts, there are differing opinions on the ways in which society views and experiences twins.
One way of reconciling these differences is to consider that non-twins may engage in both comparing and contrasting twins. It seems that while society focuses on sameness, individuals tend to focus on differences between twins in order to tell them apart. While this is understandable, the experience of being compared may be harmful for twins. This may stem from the fact that individuality is strongly encouraged in most western cultures (Bacon, 2010; Hay, 1999). Others have hypothesized that having two newborns at the same time may lead to others highlighting differences between twins and comparing them to one another (Rutter & Redshaw, 1991). Plomin (1990) opines that the contrast effect is more prevalent for fraternal twins and the perception of twins as an identical unit is more frequent for identical twins. While this claim has not been measured empirically, qualitative research seems to support this view.

Both survey data of twins and descriptive writings note that twins report that non-twins view them as one unit, two parts of one whole, and incomplete as individuals (Bacon, 2006; Bacon, 2010; Beauchamp & Brooks, 2003; Kozlak, 1978; Stewart, 2000; Thorpe, 2003; Thorpe & Gardner, 2006). Plomin (1990) refers to this as the “assimilation effect” because of its focus on aspects of twins that are similar and consistent with their view of twins as a natural unit (Beauchamp & Brooks, 2003). This conceptualization or belief that twins are one person, or a unit, may lead others to assume that twins can be referred to in the plural (e.g. “the twins” or “the Johnsons”) rather than as individuals (Bacon; Stewart). Consequently, it also seems that twins are then expected to act as a unit (Bacon). Preedy (1999) elaborates this idea:

The perception of twins and higher multiples by adults is frequently that of a natural unit. Just knowing that the children are multiples seems to affect the memory,
so that identifying them as individuals and calling them by their names becomes an impossibility (p. 78).

Preedy interviewed parents of young children and found that 20% reported that they made no effort to differentiate between their twin children, which indicates that an important minority of parents espouse the “natural unit” view of their twins. Hay (1999) hypothesizes that the way parents view their twins has an effect on how others view them as well. For instance, if parents think of their twins as a natural unit and dress and treat them accordingly, this might encourage (implicitly or explicitly) other members of society to view those twins as a natural unit as well.

Beauchamp and Brooks (2003) posit that parents have a tendency to play up similarities between twins and therefore promote the perception of them as a natural unit. According to Kozlak’s (1978) interpretation of various writings about twins, the way mothers perceive their twins is associated with some child care behaviors such as dressing the twins alike, choosing similar names for their twins and providing twins with similar toys.

**Twins’ perceptions of their experience**

When people encounter twins, particularly those who share physical characteristics, reactions may range from surprise to fascination (Sheerin, 1991; Smith, Renshaw & Renshaw, 1968; Thorpe & Danby, 2006), which suggests that twins are perceived as more special or unique than singletons (Bacon, 2006; Kozlak, 1978; Sheerin, 1991; Thorpe & Danby, 2006). Consequently, twins may be perceived and treated as if they are a unique phenomenon, receiving more attention based on their twin
status, rather than their individual traits; this has been referred to as the "prima donna effect" (Sawicki & Roguck, 1998 as cited in Beauchamp & Brooks, 2003).

Kozlak’s (1978) research with identical twins provides some support for this notion. Of the 20 participating twins she surveyed, 18 reported that they felt different or special as children. Preedy (1999) found anecdotal evidence in support of this through reports of parents who indicated that their children were recipients of increased popularity and received more attention based on their twin status.

Hay (1999) points out that there may be certain expectations about twins’ behavior depending on their zygosity. Twins who are DZ share only half of their genes, which may lead individuals to anticipate that they will behave differently, whereas MZ twins are expected to behave similarly (Hay, 1999). The accuracy of this assumption, of course, depends on the complex (and unresolved) question of the degree to which behavior is determined genetically rather than by environmental factors. Hay further points out that it is important to remember that knowing the zygosity of an individual twin pair does not provide enough information about whether or not they will behave similarly.

Pearlman (2001) evaluated differences between 30 adult (age 18 and older) identical twins, 30 fraternal twins and 30 singletons on measures of object relations, self-esteem and separation-individuation. In addition to completing measures related to these constructs, twins also were asked to describe their experiences as twins and the way their parents raised them. Of the 60 twin respondents, 42% indicated that their parents did not encourage them to be either similar or different, but more identical twins (27%) reported that their parents encouraged similarities than fraternal twins (1%). Likewise, fraternal
twins (47%) were more likely than identical twins (1%) to report that parents encouraged differences between the pair. Identical twins were much more likely (74%) to have names that rhymed than fraternal twins (28%). Clearly, zygosity seems to be associated with qualitative differences in the experiences of twins and the ways in which their parents raise them and present them to society.

According to Stewart (2000a), twins violate the expected distinctions in sibling hierarchies, which complicates the important social fact of birth order. Historically, the first born child inherits the estate when parents die and is viewed as the stronger, more aggressive, competent sibling (Yoon & Hur, 2006). Consequently, in many cultures “twinship represents a potential or actual transgression of a vital distinction through a blurring or even problematizing of differentiation by age” (Stewart, 2000b, p.721.) The biblical, perhaps archetypal, story of Jacob and Esau addresses the complications of birth order for twins. In this story, Jacob, the second born twin, deceives his father, Isaac, with the help of his mother, in order to receive the blessing intended for the first-born twin. (In a moment of near starvation, Esau, Jacob’s twin, had sold him his birthright in exchange for a meal of stew) (Stewart, 2000b). Upon learning that his brother had received their father’s blessing, Esau was overcome with sorrow and anger toward his brother for stealing his birthright. The result of this “violation” seems to be an over-valuing of the importance of twin birth order.

Hay (1999) states that parents of twins are frequently asked about which of their twins was first-born, indicating that this distinction seems to hold some importance for the question asker. Hay attributes this interest to society’s focus on the importance of individuality, which he hypothesizes plays a role in individuals (particularly parents)
attempting to identify differences between twins, even if they are insignificant. Previous research by Hay and O’Brien (as cited in Hay, 1999) showed that parents of MZ twins are consistently more favorable in their ratings of the first-born twin. This distinction occurs less frequently for DZ twins, but supports the hypothesis that parents of twins strive to differentiate their children even based upon seemingly insignificant factors like birth order (Hay, 1999).

**Common misperceptions about twins**

Both systematic studies (e.g., Bacon, 2006) and other writings about twins cite a number of assumptions about twins that are incorrect. For example, several sources (e.g., Smith, Renshaw & Renshaw, 1968; Stewart, 2000a, 2000b) indicate that many people think that twins are typically identical and same-sexed. Bacon (2006) conducted semi-structured interviews of twins and their families and found that mixed-sexed twins reported that most people did not consider them to be twins, and Stewart’s (2000b) qualitative research showed that the majority of twin parents she interviewed were most frequently asked if their twins were identical. Consistent with the misconception that all twins are identical is the finding that people tend to overestimate the prevalence of identical twins. Preedy (1999) found that teachers tended to overestimate the number of twin pairs that were identical.

Another popular belief about twins is that they have Extra Sensory Perception (ESP) and/or have the ability to feel their co-twin’s pain (Pearlman & Gannon, 1999). Currently, ESP in twins has not been supported by research, but continues to be a popular topic of discussion and debate (Pearlman & Gannon, 1999). This may be the result of reports by twins that they have a strong connection to their co-twin. Pearlman and
Gannon explain reports of ESP in twins as evidence of the deep, close connection between some twin pairs. They propose that empathy is a more likely explanation than ESP, particularly because twins are often encouraged to be aware of and in tune with their co-twins’ experiences and feelings (Pearlman & Gannon, 1999).

Penninkilampi-Kerola, Moilanen and Kaprio, (2005) point out that not all twin relationships are the same; some twin pairs are very close and supportive, while others are competitive and potentially combative. While it is appropriate to make distinctions between types of twin relationships, Penninkilampi-Kerola. Kerola and Moilanen point out that writers in this area tend to describe the twin relationship as “dependent,” which has negative connotations, rather than in neutral terms related to the twins’ attachment to each other. These concepts are similar, but the authors argue that the negative connotation assigned to dependence implies that twins are neurotic and immature and reflect a tendency in previous research and commentary on the twin-relationship to present it as a hindrance to development, rather than a benefit or protective factor (Penninkilampi-Kerola, Moilanen & Kaprio, 2005).

In an attempt to examine this feature of the twin relationship, Penninkilampi-Kerola, Moilanen and Kaprio (2005) used participants from the Finnish Twin Cohort Study, a population-based project that followed five cohorts of Finnish twins born between 1975 and 1979. They sent participants and their parents questionnaires covering topics ranging from the physical health of their twins and family medical history to aspects of the twins’ relationships. In total, the researchers surveyed 850 MZ twin pairs (706 MZ male twins, 994 female MZ twins) 872 SSDZ twin pairs (894 SSDZ males, 850 SSDZ females) and 912 OSDZ twin pairs (912 OSDZ males and 912 OSDZ females).
resulting in a sample size of 5268 twin individuals of known zygosity. Dependence was measured by asking twins two questions: “In your own opinion are you dependent on your co-twin” and “In your own opinion is your co-twin dependent on you?” (p. 524). They found that there was a significant difference between zygosity groups in terms of twin dependence, with more MZ twins reporting dependence on their co-twin (33.6% MZ compared to 19.3% DZ). There were no significant differences between the different DZ groups (Opposite-Sex Dizygotic (OSDZ) and Same-sex Dizygotic (SSDZ)) in dependence, however a strong association between co-dependence and gender was found, with girls, particularly MZ (29.2%) being more likely to report dependence on their co-twin than boys (lowest percentage 5.4% SSDZ boys) (Penninkilampi-Kerola, et al., 2005). Dependence also differed by zygosity, with SSDZ girls reporting significantly more co-twin dependence than OSDZ girls. Additionally, mothers’ reports of their children’s co-twin dependence were consistent with the twins’ self-reports.

The research findings also identified a relationship between dependence and social contacts, with twins who were co-dependent tending to spend more time with their co-twin compared to twins who reported they were not dependent. Dependent twins were also more likely to report that their co-twin was their best friend and shared more friends and hobbies with their co-twin than twins who reported they were not dependent.

Education level and parental factors, such as mothers’ education level and fathers’ socio-economic status, were also related to twin dependence (Penninkilampi-Kerola, et al., 2005). For instance, children who chose less common educational paths (such as high school or vocational programs) were more likely to be described as co-twin dependent. Additionally, twins were more likely to be co-twin dependent if their fathers were
classified as lower SES and their mothers were of a lower education level
(Penninkilampi-Kerola, et al., 2005).

Robin and Casati (1994) reviewed literature related to early childhood
experiences of twins compared to singletons, including the commonly held notion that
one twin is dominant and one submissive. Robin and Casati contend that this view is
inaccurate, and that the nature of dominance and submissiveness seems to fluctuate
throughout development. They argue that the factors by which twin
dominance/submissiveness are evaluated are dependent upon what aspects of
development are important to parents. For instance, the authors cite the work of Lytton
(1980, as cited in Robin & Casati, 1994) who found that when twins are between two- to
three-three years old, mothers are more likely to describe the more talkative twin as
dominant. Zazzo (as cited in Robin & Casati, 1994) on the other hand, believed that
when twins are OSDZ the girl is more dominant, but for same-sex twin boys, physical
strength determines dominance. This suggests that the determination of
dominance/submissiveness seems to fluctuate with time and is dependent on the
perspective of the individual making this determination.

Moilanen (1987) asked both parents and adolescent twins to evaluate
dominance/submissiveness on three dimensions: physical dominance, psychological
dominance, and which twin is the spokesperson (Moilanen, 1987). Moilanen found that
only 10% of adolescent twins studied were either dominant or submissive in all three
categories. This suggests that dominance and submissiveness in twin pairs is dynamic
and depends on factors such as the age of twins and their stage of development.
The twinship experience

It appears to be widely accepted that the development and social experience of twins is different from that of singletons (Danby & Thorpe 2006; DiLalla, 2006; Kozlak, 1978; Laffey-Ardley & Thorpe, 2006; Sheerin, 1991; Thorpe, 2003). There are also studies to suggest that twins may be raised differently than singletons. For example, Tourrette, Robin and Josse (1989) interviewed and observed 40 mothers of twins in order to evaluate whether mothers treated their twins as individuals or a unit. They found that in the majority of families (80%) feeding and sleeping practices were completed at the same time for twins, regardless of individual needs or patterns (Tourrette, et al., 1989). This finding is consistent with the literature review of Rutter and Redshaw (1991) who reported that mothers of twins tend to interact less with their children individually and, as a result, twins receive less speech directed at them, as an individual, than singletons.

Twins may have to compete with one another for resources in the family, such as adult attention, and many twins spend the majority of their time with a same-aged sibling (DiLalla, 2006; Thorpe, 2003). This may be advantageous in some situations, as twins are more likely to have someone with them when they face difficult situations in their development (Sheerin, 1991), but it also means that twins may develop an identity as half of a couple rather than as an individual.

Kozlak (1978) surveyed 10 pairs of identical twins to gain understanding of their experiences. Twins were asked to describe twinship and how they reacted to being a twin. The participants described both positive and negative aspects of twinship. While most respondents made favorable comments about being a twin, the responses of twins were varied and some respondents struggled to articulate what their experiences were like
(Kozlak, 1978). Some reported that they thought of twinship as a very unique experience that was very salient during their daily life, while others reported that this was not the case (Kozlak, 1978). A few (10%) of the twin participants reported that a negative aspect of twinship was feeling as if they were not seen as individuals; all twin participants reported that their parents treated them the same and the majority reported being frequently compared to their co-twin (Kozlak, 1978). The most frequent comparisons were based upon emotional similarities or differences between the twins (95%), followed by comparisons of physical appearance (90%), academic performance (85%), and social factors (70%); 95% of the twins in this sample also reported that they were frequently confused with their co-twin (Kozlak, 1978).

**Twinship as a social construction**

Bacon (2010) contends that twinship is a social construction, which refers to the situation in which “people construct and fabricate knowledge systems through their interactions with each other in their social world” (p. 10). It is widely held that our social identities are developed by an interaction of internal and external (social) processes through which we define ourselves and are defined by others (Bacon, 2010). Similarly, Bacon posits that twinship is a social identity, formed by social interactions and the self-perceptions of twins. This implies that both twins’ view of themselves and a society’s view of twins play a role in twins’ experiences.

Twins have been a topic of interest throughout history. From the earliest play written about twins to current advertisements featuring twins, society seems fascinated by the phenomenon of multiple births. Presentations of twins in various media often depict themes of sameness, unity, comic comparisons and sneakiness. These depictions of twins
suggest that members of society view twins in these ways, even with limited support for these beliefs. Without measuring what others think about twins, researchers are left guessing about what society expects of twins and the impact of these expectations. With clearer knowledge of beliefs about twins, researchers, twins, and their families might be better prepared to address inaccurate beliefs or promote positive views of twins.
Chapter II

Rationale and Hypothesis

Twins have often been studied as a way to understand difficult to research processes in medicine, psychology, sociology and human development. Often, such research focuses on the genetic similarities of twins to examine questions related to the nature-nurture debate. As a result, the vast majority of research on twins is focused on abnormal or pathological functioning, usually whether or not both twins have a particular pathology. These findings are then interpreted in one of two ways: as support for the view that genetics are the primary factor in pathology development, or as evidence that pathology is more complex than genetics alone. There is little focus on the experience of twinship or other developmental features of being a twin.

Unfortunately, there is little empirically-derived information about the experience of “typical” twins, despite the wealth of books and advice about how to raise twins. These sources seem to contain many commonly held beliefs about twins and the experiences of twins. This is an area that has received little, if any, attention in twin research.

Currently, there are no existing scales for measuring beliefs and myths about twins. Rather, literature on twins often contains statements about beliefs others have about twins or descriptions of culture based myths on twins. Typically, these beliefs are reported as facts, but most have not been examined empirically. Because of the lack of
empirical support for reported beliefs or myths, it seems pertinent to use exploratory research methods to identify non-twins' beliefs about twins and measure whether these beliefs tend to be positive or negative. It will also be useful to measure non-twins' knowledge about twins, as a means of exploring the impact of misconceptions on beliefs about twins.

In light of the above the following clinical hypotheses will be tested:

H1: Non-twins will endorse more negative beliefs about twins than positive beliefs.

H2: There is a statistically significant relationship between non-twins' knowledge about twins and their positive beliefs about twins, with greater factual knowledge associated with more positive beliefs about twins.

H3: There is a statistically significant relationship between number of twin pairs known to non-twin respondents and their knowledge about twins.

H4: There is a statistically significant relationship between number of twin pairs known to non-twin respondents and their positive beliefs about twins.

H5: There is a statistically significant relationship between ratings of relationship closeness to known twins and knowledge about twins.

H6: There is a statistically significant relationship between ratings of relationship closeness to known twins and positive beliefs about twins.

The following hypotheses will be tested if there is a large enough sample of twins recruited for this study:

H7: Twin respondents demonstrate statistically significantly higher scores on a measure of twin knowledge than non-twin respondents.
H8: Twin respondents rate beliefs about twins statistically significantly more positively than do their non-twin respondents.

In addition to these hypotheses, descriptive information about patterns of responses to particular belief and knowledge questions will be summarized.
Chapter III

Method

Participants

This study will include a minimum of 80 male and female participants who are undergraduates at Xavier University. Participants will be recruited through the Psychology Department participant pool at Xavier University.

Power Analysis

Based on an a priori analysis using G*power 3 (Faul, Erdfelder, Lang & Buchner, 2007), a sample size of 67 participants will be needed in order to achieve a power level of .80 with a medium effect size at a .05 alpha level. In order to increase the likelihood that there will be enough individual twins to compare their responses to those of singletons, we will attempt to survey 150 undergraduate students. Fifty-one (51) individual twin participants would be needed for an effect size of .80 with an alpha level of .05, and it is not likely that we would be able to recruit that number of twins from the Xavier undergraduate participant pool, so comparisons with twins will be done on only an exploratory basis.

Measures

Currently, there are no existing measures of attitudes and knowledge about twins. As a result, two measures have been developed for this purpose, the Beliefs About Twins Scale (BATS) and Knowledge About Twins Scale (KATS). The BATS includes several
statements related to commonly reported or popularly depicted attitudes about twins such as, “Twins have a unique bond.” Many of these statements are derived from the findings of Stewart’s (2000b) survey of the general public in the UK. Participants will be asked to indicate their agreement with these statements by using a Likert Scale (1=strongly disagree, 5=strongly agree).

Attitudes are defined as neutral, positive, or negative reactions to an idea, person, or object that is expressed at some level of intensity (Brehm, Kassin & Fein, 2002). Attitudes serve as a way to quickly evaluate a situation or object and determine whether it is good, bad, helpful or harmful (Brehm, Kassin & Fein, 2002). Attitudes are theorized to be comprised of three components, cognitive, affective and behavioral (thinkquest.org). The cognitive components of attitudes include individual’s beliefs and perceptions of stimuli (thinkquest.org). Attitudes are influenced by factors, such as beliefs and values. For instance, research has shown that there is a relationship between personal philosophical views and religious beliefs and the intensity of a person’s attitude (Brehm, Kassin & Fein, 2002).

The KATS includes several items related to factual information about twins. Some items are more common knowledge (e.g. “Identical twins occur when one fertilized egg divides”) while others are assumed to be less commonly known (e.g. “Most twins are identical”). Participants will answer these questions as either true or false, or “don’t know” in order to decrease the likelihood of false positive responses based on guesses.

In addition to completing the BATS and KATS, participants will provide demographic information as well as information about their own birth status, number of
twin pairs known to them, and how close of a relationship they have with any known twin pairs.

Procedure

The current study will be reviewed by Xavier University’s Institutional Review Board for approval. No data will be collected until the study is approved. Following approval of the study, participants will be recruited through the Xavier University Psychology Department participant pool. Information will be provided to undergraduate psychology students regarding the nature of the study, number of credit hours received for participation and information about length of participation. Those interested in participating will be provided with a link to a website where data will be collected.

Participants will complete the questionnaires online through the SurveyMonkey database. SurveyMonkey.com is an Internet survey software program that allows members to create surveys and conduct survey research online via the SurveyMonkey website (SurveyMonkey.com). Participants will be required to provide consent online before beginning the research procedure. Participants will be required to read the consent form composed by the researcher and indicate that they consent to participating by placing a check mark in a box on the online consent form. The SurveyMonkey database enables the researcher to use logic to ensure that participants are unable to begin the actual research procedure without providing their consent first. If participants indicate that they are not willing to consent to participating, they will be redirected out of the research procedure and will not complete the questionnaires.

After consenting to participation, participants will be asked to provide demographic information. The demographic information includes the participants’ age,
race and gender. Participants’ age, race and gender will be used in later analyses in order
to determine if there are any differences in participants’ responses based on these
factors. Additionally, this information will be important in evaluating how representative
the research sample is of the United States population.

Once participants provide demographic information, they will be asked to
complete the BATS and KATS. Appendix A includes a copy of these measures, as well
as a demographic information form. To control for order-effects, the order in which these
measures are completed will be randomized. Following the completion of these two
measures, participants will be asked how many twin pairs they are acquainted with. They
will then be directed to a self-report form in which they are asked to provide the number
of twins they know and how well they know the twins. This rating will be completed for
each twin or twin pair known to the participant and will be done using a Likert Scale
(0=not close to 7=extremely close). Upon completion of the demographic information
and all measures, participants will enter their name and relevant information into a
separate database, ensuring that their information will remain confidential. Additionally,
this separate database will be used to provide participants with credit for their
participation.
Chapter IV

Proposed Analyses

The purpose of this study is to investigate non-twins’ beliefs and knowledge about twins. The BATS includes an equal number of positive, neutral and negative statements about twins. The BATS is composed of three subscales, positive beliefs, neutral beliefs and negative beliefs about twins. Participants have the option of responding using a Likert Scale with responses ranging from one (strongly disagree) to five (strongly agree). A composite score will be calculated for each of these subscales by adding individual item scores for each participant. The result will be a total score for each participant on all three subscales of the BATS. In order to test Hypothesis 1, which states that overall beliefs about twins are negative, a Z test will be conducted that compares the scores on positive beliefs about twins to the scores on negative beliefs about twins. In order to evaluate the factor structure of the BATS, a factor analysis will be conducted.

Hypothesis 2, which states that there is a statistically significant relationship between non-twins’ knowledge about twins and their positive beliefs about twins, will be tested using a Pearson product-moment correlation (r). Scores on the KATS will be correlated with scores on the BATS. Specifically, the KATS will be scored by assigning a score of one for correct answers to items and a score of 0 for incorrect responses or responses of “Don’t Know”. The total score will be derived from the sum of item scores. This total knowledge score will be correlated with the previously discussed positive beliefs score.
Hypothesis 3, which states that there is a statistically significant relationship between number of twin pairs known to respondents and their knowledge about twins, will also be tested using the Pearson product-moment correlation. This will be done by using the response participants’ provide regarding the number of twin pairs they know (see question 7 on the demographic questionnaire, Appendix A) and the total KATS score. Hypothesis 4, that there is a statistically significant relationship between number of twin pairs known to respondents and their positive beliefs about twins will be tested using the Pearson product-moment correlation. This will be done by using participants’ scores on the positive belief section of the BATS and the reported number of twin pairs they know.

In order to test hypotheses 5 and 6, that there is a statistically significant relationship between rating of relationship closeness to known twins and knowledge about twins or positive beliefs about twins, respectively, a relationship closeness rating will be assigned to each participant. Specifically, participants’ responses to question 8 on the demographic questionnaire will be used. This question requires participants to list each twin they are acquainted with and rate how close they are to that twin on a scale from 1 to 7. In the event that a participant is acquainted with several twins, the highest rating will be used and assigned as the participant’s relationship closeness rating. This relationship will be tested using the Pearson product-moment correlation.

Hypotheses 7 and 8, which state that twin respondents will have higher scores on a measure of knowledge and more positive beliefs about twins than non-twin respondents, will be tested if a large enough sample of twins is recruited. To perform this analysis, at least twenty individual twins’ responses will be necessary. In that event, t-
tests for independent samples will compare the number of correct responses on the KATS and the score on the BATS for twins and non-twins.

All hypotheses will be tested using an alpha level of .05.
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Appendix A

Please answer the following questions about yourself and twins you know.

1. Are you a twin?  YES or NO

If so, are you monozygotic (identical) or dizygotic (fraternal)?  ______________ Not Sure

If you are a fraternal twin is your co-twin male or female?  ______________

2. Are you a “multiple” (triplet, quadruplet, etc.)?  YES or NO

If yes, describe the gender makeup of your set.  ______________

3. Are any of your siblings twins?  YES or NO

If so, are they monozygotic (identical) or dizygotic (fraternal)?  ______________ Not Sure

If they are fraternal, are they both the same sex?  YES or NO

4. Are any other members of your immediate family twins?  YES or NO

If so, are they monozygotic (identical) or dizygotic (fraternal)?  ______________ Not Sure

5. Are any members of your extended family twins?  YES or NO

If so, are they monozygotic (identical) or dizygotic (fraternal)?  ______________ Not Sure

6. Are any of your friends twins?  YES or NO

If so, are you friends with both twins?  YES or NO

Is your friend identical (monozygotic) or fraternal (dizygotic)?  ______________ Not Sure

7. Discussion of or information about twins has been a major topic in courses I have taken. (1=strongly disagree, 5=strongly agree)

   1  2  3  4  5

8. How many sets of twins do you know? (circle one answer)  
a.  0  
b.  1  
c.  2  
d.  3  
e.  4  
f.  5
g. 6
h. 7
i. 8
j. 9
k. 10 or more
Complete this section for each twin you know:

<table>
<thead>
<tr>
<th>Age and gender of twin</th>
<th>Identical or Fraternal?</th>
<th>What is your relationship to them?</th>
<th>On a scale of 1 to 7 (1=not close, 7=very close), rate how close you are to this twin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Knowledge About Twins Scale
The following is a list of statements about twins. Please circle either TRUE, FALSE or DON'T KNOW for each statement.

1. Twins run in families
   TRUE   FALSE   DON'T KNOW

2. Twins skip a generation
   TRUE   FALSE   DON'T KNOW

3. Because they are part of the same pregnancy, twins are biologically different than singletons
   TRUE   FALSE   DON'T KNOW

4. Twins are becoming less common
   TRUE   FALSE   DON'T KNOW

5. Twins always have the same mother
   TRUE   FALSE   DON'T KNOW

6. Fraternal twins occur when two separate eggs are fertilized.
   TRUE   FALSE   DON'T KNOW

7. Twins always have the same father
   TRUE   FALSE   DON'T KNOW

8. Identical twins occur when one fertilized egg divides.
   TRUE   FALSE   DON'T KNOW

9. Most twins are identical
   TRUE   FALSE   DON'T KNOW

10. Boy/girl twins are identical
    TRUE   FALSE   DON'T KNOW

11. Identical twins have the same fingerprints.
    TRUE   FALSE   DON'T KNOW

12. Fraternal twins have the same DNA.
    TRUE   FALSE   DON'T KNOW

13. Older women are more likely to have twins.
    TRUE   FALSE   DON'T KNOW

14. Most twin pregnancies are the result
    TRUE   FALSE   DON'T KNOW
of fertility treatments.

<table>
<thead>
<tr>
<th>Question</th>
<th>True</th>
<th>False</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Twins can have different gestational ages (i.e. egg can be fertilized at different times)</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON’T KNOW</td>
</tr>
<tr>
<td>16. Twins are more likely to be left handed than singletons</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON’T KNOW</td>
</tr>
<tr>
<td>17. The rate of twinning is the same worldwide.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON’T KNOW</td>
</tr>
<tr>
<td>18. Twin pregnancies are considered “high risk.”</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON’T KNOW</td>
</tr>
<tr>
<td>19. Identical twins are always the same height.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON’T KNOW</td>
</tr>
<tr>
<td>20. Fraternal twins have more genes in common than regular siblings.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON’T KNOW</td>
</tr>
</tbody>
</table>
Beliefs About Twins Scale
For the following statements about twins, please indicate your level of agreement
(1= strongly disagree and 5= strongly agree)

1. Twins can feel each other’s pain.  
2. Twins are able to read their co-twins mind. 
3. In twin pairs, one is good and one is evil.
4. Twins have a unique bond.
5. Twins are more likely to have psychological problems than non-twins.
6. Twins are dependent on one another.
7. Twins should be separated in school.
8. It is ok to compare twins to each other.
9. Twins should be called by the same name, or referred to as “the twins.”
10. Twins are mischievous
11. Twins share the same friends.
12. Twins have troubled marriages.
13. Twins are better at sharing than singletons.
14. Mothers of twins usually have used fertility drugs.
15. Often, one twin is better at some things than their co-twin.
16. Twins have their own language.
17. Knowing the birth order of twins is important.
18. One twin is dominant, one is submissive.
19. Twins are twice as hard to raise.
20. Twins are double trouble.
21. Twins are competitive with each other.
22. Twins are similar. 1 2 3 4 5
23. Twins are different. 1 2 3 4 5
24. Twins are a unit. 1 2 3 4 5
25. Twins are interesting. 1 2 3 4 5
26. Twins are special. 1 2 3 4 5
27. I wish I were a twin. 1 2 3 4 5
28. Twins have different social worlds than singletons. 1 2 3 4 5
29. I would like to be friends with a twin. 1 2 3 4 5
30. I would like to have a twin as a roommate. 1 2 3 4 5
31. Twins are just like everyone else. 1 2 3 4 5
32. The relationship between fraternal twins is like any other sibling relationship. 1 2 3 4 5
33. Twins are good luck. 1 2 3 4 5
34. Twins are cute. 1 2 3 4 5
35. Twins are close friends with each other. 1 2 3 4 5
36. I would like to have twins. 1 2 3 4 5
37. Twins are charming. 1 2 3 4 5
38. Twins have trouble being independent. 1 2 3 4 5
39. Twins are confusing. 1 2 3 4 5
40. Twins make life easier for parents. 1 2 3 4 5
41. Twins are expensive for parents. 1 2 3 4 5
42. Twins have trouble in school. 1 2 3 4 5
43. Twins are good at sharing and cooperating with each other. 1 2 3 4 5
44. Twins make life difficult for other siblings. 1 2 3 4 5
45. Twins should be dressed alike.  
46. It would be difficult to be a twin.  
47. I like twins.  
48. Twins have to fight for individual attention from their parents.  
49. Twins are less lonely than non-twins.  
50. Twins are difficult to be friends with.  
51. Twins are closer than normal siblings.  
52. Twins play tricks on people.  
53. Twins have similar personalities and feelings.  
54. Twins are supportive of each other.  
55. Twins make me uneasy.  
56. Twins are a bad omen  
57. Twins are not as smart as non-twins.  
58. Twins are good at making friends.  
59. Twins are more popular than non-twins.  
60. The twin bond is very special.
Chapter V: Dissertation

Abstract

This study explored knowledge and attitudes about twins in a sample of 326 undergraduate students; 20 students in the sample self-identified as twins. There were small but significant correlations between students’ knowledge about twins' scores and positive attitude toward twins scores, and an inverse correlation between knowledge about twins and the negative attitudes toward twins score. Additionally, a small but significant correlation was found between individuals' knowledge about twins and the number of twins in their social sphere. Positive attitudes about twins' scores were also significantly correlated with number of twin pairs known to the respondent and with rated degree of closeness to twins. Finally, an independent samples t-test revealed a significant difference between twins' and non-twins' positive attitudes about twins, with twins having more positive attitudes about twins than non-twins. A frequency analysis of survey items revealed that, in general, participants were familiar with basic information about twins, but were less knowledgeable about less commonly reported information about twins.

While most student attitude scores appear to have been fairly neutral, exposure to twins is associated with more positive attitudes and greater knowledge, which is consistent with findings regarding other attitudes toward minority groups. Replicating these findings with a larger, more heterogeneous sample is recommended to further expand our knowledge in this area.  

*Keywords*: knowledge, attitudes, twins.
Knowledge and Attitudes About Twins

Twins are two children who are the product of one birth (Hine, 2009). Twins are the most frequent type of multiple births (TWINS Research, 2011). According to the Center for Disease Control and Prevention (CDC, 2008), there were 138,660 twin births in 2008 in the United States, or 32.6 for every 1,000 births. There are currently approximately 4.5 million individuals who are twins living in the US, comprising about 2% of the general population (Twins Foundation, 2009).

There are two main categories of twins, identical and fraternal, although more recent findings suggest that the classification of twins may be more complex than this dichotomy, including the existence of a category of "half-identical" twins which occurs when one egg is fertilized by two separate sperm, leading to twins who have identical DNA from their mother but different DNA from their father (NOMOTC, Inc., 2013). According to the traditional distinction, identical (monozygotic or MZ) twins result when one fertilized egg divides into two separate, genetically identical eggs, whereas fraternal (dizygotic or DZ) twins are the result of two eggs that are fertilized simultaneously (Hine, 2009). Fraternal twin births account for two-thirds of all twin births, with the occurrence of male-female fraternal twins (OSDZ) and same-sexed fraternal twins (SSDZ) equally represented (Twins Foundation, 2009).

Twins have played an important role in scientific research, as twins (especially identical twins) provide a means to study difficult to research processes in medicine, psychology, sociology and human development. The use of twins in research is often referred to as the "twin method" and the creation of this method is attributed to the work of Sir Francis Galton (Smilansky, 1992). Galton viewed twins as the key to
distinguishing between the effects of heredity and later life experiences (Stewart, 2000b). The vast majority of systematic research on twins has focused on abnormal or pathological aspects of adjustment, often whether or not both twins will express a particular pathology. These findings are then interpreted in one of two ways: As support for the view that genetics are the primary factor in pathology development, or as evidence that pathology is more complex than genetics alone. Whereas many forms of pathology have been studied using the “twin method”, there has been little research on non-pathological features of twin development or an examination of the effect of social expectations placed on twins. Despite this paucity of systematically-derived knowledge, there is a plethora of books and popular articles about twins, the twin experience, and advice about raising twins. More recently, interest has increased in the study of twins for the sake of studying their unique experiences, and identifying risk and protective factors for twins.

Both Stewart (2000a) and Bacon (2010) contend that twin births are seen as an anomaly to the typical birth process because they are unusual. Therefore, cultures have developed myths and cultural rituals to make sense of twin births (Bacon, 2010). For example, the Native Americans of the Northwest of the United States, viewed twins with fear and believed they were a bad omen (Pector, 2003). In contrast, the Yoruba of Nigeria revered twins as divine (Stewart, 2000a). Regardless of individual culture’s views of twins, these societies use rituals, myths and legends to either cope with or make sense out of twin births and how twins were conceived. The myth of Castor and Pollux serves as an example of a common story of the origin of twins; in this case, it involves twins being fathered by two different men, one mortal and the other immortal (Gehman,
In current times, Pearlman and Gannon (2000) authored an advice book for parents about raising twins that included a chapter on myths about twins. The inclusion of this chapter suggests that understanding society’s beliefs about twins (whether accurate or inaccurate) may be helpful for both twins and their parents as they encounter and attempt to cope with some of the unique aspects of twinship such as being frequently compared to a co-twin, receiving extra attention because of being a twin, struggling to form an individual identity, and answering questions based on commonly misunderstood features of twins.

Common misperceptions about twins

Both systematic studies (e.g., Bacon, 2006) and other writings about twins cite a number of assumptions about twins that are incorrect. For example, several sources (e.g., Smith, Renshaw & Renshaw, 1968; Stewart, 2000a, 2000b) indicate that many people think that the majority of twins are identical and same-sexed. Bacon (2006) interviewed twins and their families and found that mixed-sexed twins reported that most people did not consider them to be twins; Stewart (2000b) found that the majority of twin parents she interviewed were most frequently asked if their twins were identical. Consistent with the misconception that most twins are identical is the finding that people tend to overestimate the prevalence of identical twins (e.g., Preedy, 1999).

Another popular belief about twins is that they have Extra Sensory Perception (ESP) and/or have the ability to feel their co-twin’s pain (Pearlman & Gannon, 1999). Currently, ESP in twins has not been supported by research, but continues to be a popular topic of discussion and debate (Pearlman & Gannon). This may be the result of reports by twins that they have a strong connection to their co-twin. Pearlman and Gannon
explain reports of ESP in twins as evidence of the deep, emotional connection between some twin pairs, proposing that empathy is a more likely explanation than ESP, particularly because twins are often encouraged to be aware of and in tune with their co-twins’ experiences and feelings (Pearlman & Gannon, 1999).

Penninkilampi-Kerola, Moilanen and Kaprio, (2005) point out that not all twin relationships are the same; some twin pairs are very close and supportive, whereas others are competitive and potentially combative. Penninkilampi-Kerola et al. also point out that writers in this area tend to describe the twin relationship as “dependent,” which has negative connotations, rather than in neutral terms related to the twins’ attachment to each other. These concepts are similar, but the authors argue that the negative connotation assigned to dependence implies that twins are neurotic and immature and reflect a tendency in previous research and commentary on the twin-relationship to present it as a hindrance to development, rather than a benefit or protective factor.

**Twinship as a social construction**

Bacon (2010) contends that twinship is a social construction, which refers to the situation in which “people construct and fabricate knowledge systems through their interactions with each other in their social world” (p. 10). It is widely held that our social identities are developed by an interaction of internal and external (social) processes through which we define ourselves and are defined by others (Bacon, 2010). Similarly, Bacon posits that twinship is a social identity, formed by social interactions and the self-perceptions of twins. This implies that both twins’ views of themselves and a society’s view of twins play a role in twins’ experiences. However, there has been limited systematic study of twins’ experiences. The notable exception is the work of two
sociologists, Stewart (2000 a & b) and Bacon (2006 & 2010), who have conducted qualitative studies on the twin experience and have also written books on this topic.

Stewart (2000b) utilized qualitative research methods to examine non-twins' perceptions of twins. She used two samples: Members at a conference on twins and the general public. The first sample was comprised of 100 individuals who were attending a conference in Britain held by the Twins and Multiple Births Association (TAMBA). The majority of the sample was mothers of twins, with the rest being siblings, grandparents, or fathers of twins. These participants were given a two question interview in which they were asked: “When you tell people you have twins, what is their reaction?” and “Once people knew you had twins, what was their first question to you?” (pp. 119-120). The second sample was comprised of 302 people who were stopped in public areas in London and Oxford, England and questioned. Attempts were made to obtain a balanced representation of both genders, resulting in a non-random sample. These participants were asked, “What are the first three things that come to your mind when you hear the word twins?” (p. 119).

Of the 198 total responses to the first question asked at TAMBA, 111 (56%) were categorized as positive (Stewart, 2000b). Many of the 87 negative responses tended to be empathic to the parents’ situation (e.g., “better you than me”). There were 106 responses to the second question, 84% of which indicated that the first question people asked parents’ of twins was whether or not the twins were identical. Less frequently cited responses (under 10% each) were related to gender, temperament, birth order, when the parents found out about the twin pregnancy, and if the twins were “as alike as two peas in
a pod?” (p.121). This supports Bacon’s (2010) contention that society focuses on the sameness of twins.

The street survey resulted in 823 individual responses that were entered separately and then sorted into 122 different categories (Stewart, 2000b). The most common response was “Identical” (24%), followed by “Twins known to the respondent” (20%), babies and children (17%), twins from films (15%), word association (10%) and two (9%) (p. 124). The researchers found that 55% of responses could be categorized as positive or negative; the remaining 45% were neutral (Stewart, 2000b). Of these 55%, 39% were classified as negative and 16% were classified as positive. This reflected a higher percentage of negative responses than were generated by twins’ relatives.

Stewart (2000a) theorized that the social construct of twinship emphasizes similarity, creating the expectation that twins should look alike and act alike, which implies that twins are copies of the same individual. Indeed, a definition of the word “twin” is “two persons closely related or closely resembling each other” (Merriam-Webster, 2011). A consequence of this emphasis on similarity is that twins should receive the same treatment (Stewart, 2000a). In addition to the expectation of similarity, Pector (2002) has found evidence that many cultures view twins (and other products of multiple births) as fundamentally different from singletons. This suggests that the way individual twins are viewed by others is influenced by their twin status. For instance, Kozlak (1978) reported that the twins she surveyed indicated that they were treated as if they were special, or as if they were half of a person. Qualitative research by Bacon (2006) supports this: The twins in her study reported that people treated them as if they were one person and did not view them as individuals.
In light of the limited systematic study of perceptions of twins, the aim of the current study was to gather information about the ways individuals perceive twins and their experiences as well as to identify assumptions that are made about twins and level of knowledge about twins.

**Method**

**Participants**

Participants were 326 undergraduate students enrolled in psychology courses at a private, medium sized university in the Midwest. Most of the sample (59.6%) were women and 81.6% self-identified as Caucasian. The majority of participants (95.1%) ranged in age from 18 to 24, and the largest portion (36.7%) was in their junior year of college, and identified as singletons (93.6%). Non-singletons included 20 twins (6.1%), nine of whom described themselves as identical (45% of twins). One individual self-identified as a quadruplet. Detailed information about the demographic characteristics of the sample is provided in Table 1.

**Measures**

Beliefs About Twins Scale (BATS). Because there are no existing measures of attitudes about twins, this measure was developed for the current study. The BATS (see Appendix A) includes several statements related to commonly reported or popularly depicted attitudes about twins such as, “Twins have a unique bond.” Many of these BATS items were derived from Stewart’s (2000b) survey of the beliefs about twins. Participants rated their agreement to each statement on a Likert Scale (1=strongly disagree, 5=strongly agree). The BATS was designed to include positive, neutral and
negative statements about twins so as to create three subscales: positive attitudes, neutral attitudes and negative attitudes about twins.

To make sure that these subscales were based on psychometric properties, a factor analysis was conducted on the 60 items of the BATS in order to identify the underlying factor structure of the measure and attempt to identify items that could be considered subscales of positive and negative attitudes about twins. A maximum likelihood extraction method was used because the data were assumed to be normally distributed and the use of this method is considered to be best practice. Review of the scree plot and factor matrix revealed a seven factor structure. A Varimax rotation with Kaiser Normalization was used and the rotation converged in 13 iterations. The rotated factor matrix was reviewed and items that loaded on two or more factors were eliminated. A cut off score of .30 was used in order for an item to be included. In total, 21 of the 60 original items were eliminated because they loaded on two or more factors. The remaining 39 items each loaded on one of the seven factors. After reviewing the seven factors and the items that comprised them, it was determined that Factor 1 (13 items) measured negative attitudes about twins and Factor 2 (10 items) measured positive attitudes about twins. There was no clear factor that appeared to be measuring neutral attitudes about twins. Table 2 provides the factor loadings and lists the items on the positive and negative attitudes scale. A score was calculated for each of these subscales by adding individual item scores for each participant; each participant had a score on both subscales of the BATS.

Knowledge About Twins Scale (KATS). The KATS (see Appendix B) was developed for this study to measure respondents’ factual information about twins. Some
items captured common knowledge about twins (e.g., “Identical twins occur when one fertilized egg divides”) whereas others were designed to assess respondents’ knowledge of information that was assumed to be less commonly known (e.g., “Most twins are identical”). Participants answered these questions as either true or false, or “don’t know” in order to decrease the likelihood of correct responses based on guesses. The KATS was scored by assigning a 1-point for each correct answer and a 0 for incorrect or “Don’t Know” responses. The total knowledge score was derived from the sum of item scores.

Demographic information form. Participants provided demographic information about themselves, along with specific information related to twins, such as their own birth status, number of twin pairs known to them, and how close of a relationship they have with any known twin pairs on this form (see Appendix C)

Procedure

The Xavier University Institutional Review Board (IRB) approved the study (see Appendix D). Participants were recruited through the participant pool operated by the psychology department; most participants were fulfilling a course requirement for their participation. They completed the study questionnaires online through the Survey Gizmo database. SurveyGizmo.com is an Internet survey software program that allows members to create surveys and conduct survey research online through a website (SurveyGizmo.com) that protects the confidentiality of respondents. Participants were required to indicate consent online before beginning the questionnaires for this study.

Participants completed the demographic questionnaire first; to control for order-effects, the BATS and KATS were presented in counter-balanced order. Following the completion of these two measures, participants were directed to a form on which they
entered their name and relevant information into a separate database so that they could be
given course credit for participation while maintaining the anonymity of their responses.

Results

The current study was designed to generate information about how twins are
perceived by others, particularly with regard to how accurately people understand basic
information about twins, and what types of assumptions people make about twins and
their experiences. To begin to accomplish this aim, two measures were developed to
measure participant’s knowledge about twins and to determine how frequently they held
commonly cited assumptions about twins.

The first aim of this study was to determine whether non-twins endorsed more
positive than negative attitudes about twins. A paired samples t-test was conducted using
participants’ standardized scores on the negative and positive attitudes subscales of the
BATS. The results indicated that the mean score on the positive attitudes scale (M = -.05,
SD = .97) was not significantly greater than the mean score on the negative attitudes scale
(M = -.01, SD = .98), t(305) = -.57, p = .57.

Another aim of this study was to examine the relationship between non-twins’
knowledge about twins and their attitudes about twins. The Pearson correlation between
participants’ total score on the KATS and their total score on the positive attitudes
subscale of the BATS was small, but significant, r (306) = .17, p = .002, indicating that
greater knowledge about twins is associated with more positive attitudes toward twins. A
small, but significant negative correlation was found between non-twin participants’
KATS total score and negative attitudes about twins, r (306) = -.14, p = .01 (See Table
3). This indicates that a lower level of knowledge about twins is associated with more negative attitudes toward twins.

We also explored the relationship between number of twin pairs known to non-twin respondents and their knowledge about twins. The Pearson correlation computed using participants' total score on the KATS and the number of twin pairs known to the respondent also resulted in a small but significant correlation, \( r(304) = .13, p = .03 \). Thus, at least in this college student sample, participants' knowledge about twins was positively related to the number of twin pairs they know.

Similarly, we examined the relationship between number of twin pairs known to non-twin respondents and their attitudes about twins (See Table 4). There was a small but significant correlation between participants' total score on the positive attitudes subscale of the BATS and the number of twin pairs known to the respondent, \( r(304) = .18, p = .002 \). The correlation between number of twin pairs known to non-twin respondents and their negative attitudes about twins was not significant, \( r(304) = .005, p = .93 \).

To further explore these relationships, we examined participants' ratings of relationship closeness to known twin pairs and their knowledge and attitudes about twins using participants' scores on the KATS, their positive and negative attitude scores on the BATS. Table 5 presents the results of these analyses. As can be seen, there was no significant relationship between the KATS total score and self-rated degree of closeness to twins or between rated degree of closeness to known twin pairs and negative attitudes about twins. In contrast, the positive attitudes score of the BATS and rated degree of closeness to twins was significant. We also examined the BATS and KATS scores of twins \((n = 20)\) versus those students who were not the product of a multiple birth \((n \)
=306). The means, standard deviations and results of independent samples t-tests are presented in Table 6. As can be seen, there was no significant difference in twins’ versus non-twins’ scores on the KATS, \( t(324) = 1.42, p = .09 \), however there was a significant difference in twins' versus non-twins' scores on the positive attitudes scale of the BATS, \( t(324) = 3.76, p = .001 \); on the negative attitudes scale, the groups did not differ significantly, \( t(324) = 9.72, p = .47 \).

In order to determine participants' level of knowledge about twins, a frequency analysis was conducted of the items on the KATS. Table 7 provides frequency of correct and incorrect responses for each item. In general, it appears that this sample was familiar with some basic information about twins, for example 85% \( (n=277) \) correctly answered that identical twins occur when one fertilized egg divides, while individuals had less knowledge about less commonly reported information about twins. For instance, only 16.6% \( (n=54) \) of the sample correctly responded that twins are more likely to be left handed than singletons.

**Discussion**

Although there are many books written about twins and twins have been subjects of many psychology studies to examine the contribution of genes versus environment, there has been very little empirical work done examining how twins are seen by others, what people know about twins, and what, if any, relationship exists between the number of twins known to an individual and their attitudes and knowledge about twins in general. In the present study we generated data to attempt to answer these questions. In addition to generating information about attitudes about twins specifically, the current study allowed for the examination of attitudes about twins as a type of minority, and examined the
degree to which attitudes about twins follow patterns that have been found with other minority groups.

In order to better understand the ways in which non-twins perceive twins, we had undergraduate students complete the BATS, which was found to be comprised of two factors that measure negative and positive attitudes. Non-twins' positive and negative attitude scores did not differ significantly, suggesting that, at least in this sample, perceptions of twins are not clearly positive or negative. This finding fails to replicate Stewart (2000b), who found that participants in a street survey in the UK had a higher percentage of negative responses to twins. However, when Stewart surveyed parents of twins in the UK, she found that in general, participants reported that people's responses to hearing they were giving birth to twins were more positive than negative (2000b). It should be noted that in both of these cases, Stewart did not statistically analyze data, as she was interpreting qualitative data. Therefore, it is not possible to say definitively that our current findings are either different or similar to Stewart’s (2000b).

Our second aim was to examine the relationship between non-twins' knowledge about twins and their positive and negative attitudes about twins. The results of correlations between non-twin participants’ scores on the KATS and their positive or negative attitudes about twins indicates that there is a relationship between non-twins' level of knowledge about twins and their attitudes towards them. As knowledge about twins increased, so did positive attitudes about twins while in contrast, lower levels of knowledge were related to negative attitudes about twins. As is the case with studies of other groups of minorities (e.g., Roberts & Farhana (2010) whose research showed a significant relationship between level of knowledge and stigma towards individuals with
epilepsy) the current findings indicate that attitudes about twins are influenced by an individual's level of factual knowledge; further, while attitudes towards twins may not initially be significantly positive or negative, the introduction of a second factor, like level of factual knowledge, affects the valence of an individual's attitude about twins. To date, this is the first study to examine the relationship between attitudes about twins and level of knowledge about twins. The results of our study indicate that this may be an area that warrants continued research. This finding seems consistent with research in the area of attitudes about stigmatized groups in general; stereotyped attitudes and negative views seem to be related to lack of knowledge about a particular group (Roberts & Farhana, 2010).

A related area of interest in our study was to examine the relationship between the number of twin pairs known to non-twin respondents and their knowledge about twins. We found a small but significant positive relationship between the number of twin pairs known to individuals and their level of knowledge about twins. One could theorize that as individuals have more contact with twins, they gain greater factual information about them. This is consistent with the intergroup contact hypothesis as proposed by Allport (1954 as cited in Pettigrew, 1998). This hypothesis proposes that prejudiced attitudes are reduced when two groups are exposed to each other. One outcome of this process is that the ingroup (in this case non-twins) learns information about the outgroup (twins) through this exposure to the outgroup (Pettigrew, 1998). Again, to date, this question has not been examined empirically in other studies related to attitudes about twins.

We also examined the relationship between number of twin pairs known to non-twin respondents and their attitudes about twins. We found that there was a small, but
significant relationship between participants’ positive attitudes toward twins and the number of twin pairs they know. Similar to our finding that increased familiarity was associated with greater knowledge about twins, our results also suggest that this increased familiarity also increases positive attitudes toward twins. This is consistent with the social psychology concept of proximity, which suggests that we are most likely to be attracted to people with whom we have more frequent contact (Lilienfeld, Lynn, Namy & Woolf, 2011). Again, this implies that individuals’ attitudes about twins may initially be neither positive nor negative, but as their familiarity with twins increases through proximity they begin to develop more positive attitudes toward them.

To further explore these relationships, we examined participants’ ratings of relationship closeness to known twin pairs and their knowledge and positive and negative attitudes about twins. Whereas degree of closeness to twins and knowledge about twins and degree of closeness and negative attitudes were not significantly related, there was a significant relationship between degree of closeness to twins and positive attitudes about twins. This suggests that individuals’ get to know twins more intimately and are in close relationships with them, they form increasingly positive attitudes about twins in general. This is consistent with the social psychological principle, the mere exposure effect which suggests that as individuals’ are continually exposed to a stimulus (in this case, twins) they are more likely to feel positive towards it (Lilienfeld, et al., 2011).

We also explored the BATS and KATS scores of twins compared to those who were not a product of a multiple birth. There was no significant difference in twins’ and non-twins' scores on level of knowledge about twins or negative attitudes about twins. This finding, while surprising, helps shed light on our finding that degree of closeness to
twin pairs was not significantly associated with knowledge about twins; if twins do not have greater factual knowledge about themselves than non-twins do, increasing an individual's degree of closeness to twins does not make them more likely to increase their own level of knowledge about twins. In contrast, there was a significant difference between twins' and non-twins' scores on positive attitudes about twins, with twins showing more positive attitudes about twins in general than non-twins. While this difference was significant, it is worth noting that, in general, non-twins' attitudes about twins were also quite positive. Specifically, the possible range of scores on the positive beliefs section of the BATS was from 10 to 50 points (with 50 being the most positive). Twin participants had a mean score of 36.55 on this measure, indicating generally positive attitudes towards twins. Non-twins mean score on this measure (31.47) also indicate generally positive attitudes about twins, just not as positive as twins' attitudes about themselves.

Finally, we evaluated participants' level of knowledge about twins. Our findings indicate that our sample was familiar with some basic information about twins, but was less knowledgeable about less commonly reported information about twins. Again, there have been no other studies conducted that have explored the relationship between individuals' level of knowledge about twins and their attitudes toward them. Additionally, no previous research has examined how much information people know about twins. Future research in this area could explore the type of information about twins that is presented through outlets like movies, televisions shows, books and articles and the accuracy of this information.
Because our study was exploratory in nature and addressed topics that have yet to be examined in empirical research, our study has several limitations. We evaluated the knowledge and attitudes of a college sample, so it is not clear that participants' knowledge and attitudes about twins reflect that of the broader population. Second, the measures that were used were self-designed and although a factor analysis was conducted on the BATS to support the measure, in general, our measures have limited psychometric properties in that reliability and validity information is not known at this time.

In summary, our findings indicate that in general, individuals' attitudes about twins are neither strongly positive nor negative, but attitudes about twins are influenced by several factors including whether an individual is a twin, level of knowledge about twins, number of twins an individual knows, and degree of perceived closeness to twins. So while individuals may initially have neither positive nor negative attitudes about twins, the introduction of a variable like level of knowledge or number of twin pairs known to an individual, etc. appears to affect the individual's attitude towards twins. Similarly, level of knowledge about twins may be impacted by factors including number of twins known to an individual. These findings are particularly noteworthy because the number of twins in the U.S. population continues to grow, suggesting that individuals will continue to be exposed to twins in a variety of settings, setting the stage for the potential to increase positive attitudes about twins through the dissemination of information about twins and the opportunity for individuals to have greater proximity and exposure to twins in general. Future research should continue to explore these relationships. A second future direction for research in this area would be to focus on improving the psychometric properties of the measures we used.
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Appendix A

*Beliefs About Twins Scale*

For the following statements about twins, please indicate your level of agreement (1 = strongly disagree and 5 = strongly agree)

1. Twins can feel each other’s pain.  
2. Twins are able to read their co-twins mind.  
3. In twin pairs, one is good and one is evil.  
4. Twins have a unique bond.  
5. Twins are more likely to have psychological problems than non-twins.  
6. Twins are dependent on one another.  
7. Twins should be separated in school.  
8. It is ok to compare twins to each other.  
9. Twins should be called by the same name, or referred to as “the twins.”  
10. Twins are mischievous  
11. Twins share the same friends.  
12. Twins have troubled marriages.  
13. Twins are better at sharing than singletons.  
14. Mothers of twins usually have used fertility drugs.  
15. Often, one twin is better at some things than their co-twin.  
16. Twins have their own language.  
17. Knowing the birth order of twins is important.  
18. One twin is dominant, one is submissive.  
19. Twins are twice as hard to raise.  
20. Twins are double trouble.  
21. Twins are competitive with each other.
22. Twins are similar. 1 2 3 4 5
23. Twins are different. 1 2 3 4 5
24. Twins are a unit. 1 2 3 4 5
25. Twins are interesting. 1 2 3 4 5
26. Twins are special. 1 2 3 4 5
27. I wish I were a twin. 1 2 3 4 5
28. Twins have different social worlds than singletons. 1 2 3 4 5
29. I would like to be friends with a twin. 1 2 3 4 5
30. I would like to have a twin as a roommate. 1 2 3 4 5
31. Twins are just like everyone else. 1 2 3 4 5
32. The relationship between fraternal twins is like any other sibling relationship. 1 2 3 4 5
33. Twins are good luck. 1 2 3 4 5
34. Twins are cute. 1 2 3 4 5
35. Twins are close friends with each other. 1 2 3 4 5
36. I would like to have twins. 1 2 3 4 5
37. Twins are charming. 1 2 3 4 5
38. Twins have trouble being independent. 1 2 3 4 5
39. Twins are confusing. 1 2 3 4 5
40. Twins make life easier for parents. 1 2 3 4 5
41. Twins are expensive for parents. 1 2 3 4 5
42. Twins have trouble in school. 1 2 3 4 5
43. Twins are good at sharing and cooperating with each other. 1 2 3 4 5
44. Twins make life difficult for other siblings.  
45. Twins should be dressed alike.  
46. It would be difficult to be a twin.  
47. I like twins.  
48. Twins have to fight for individual attention from their parents.  
49. Twins are less lonely than non-twins.  
50. Twins are difficult to be friends with.  
51. Twins are closer than normal siblings.  
52. Twins play tricks on people.  
53. Twins have similar personalities and feelings.  
54. Twins are supportive of each other.  
55. Twins make me uneasy.  
56. Twins are a bad omen  
57. Twins are not as smart as non-twins.  
58. Twins are good at making friends.  
59. Twins are more popular than non-twins.  
60. The twin bond is very special.
Appendix B

*Knowledge About Twins Scale*

The following is a list of statements about twins. Please circle either TRUE, FALSE or DON'T KNOW for each statement.

<table>
<thead>
<tr>
<th>1. Twins run in families</th>
<th>TRUE</th>
<th>FALSE</th>
<th>DON'T KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Twins skip a generation</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>3. Because they are part of the same pregnancy, twins are biologically different than singletons</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>4. Twins are becoming less common</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>5. Twins always have the same mother</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>6. Fraternal twins occur when two separate eggs are fertilized.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>7. Twins always have the same father</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>8. Identical twins occur when one fertilized egg divides.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>9. Most twins are identical</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>10. Boy/girl twins are identical</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>11. Identical twins have the same fingerprints.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>12. Fraternal twins have the same DNA.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>13. Older women are more likely to have twins.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>14. Most twin pregnancies are the result of fertility treatments.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>15. Twins can have different gestational ages (i.e. egg can be fertilized at different times)</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>16. Twins are more likely to be left handed than singletons</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>17. The rate of twinning is the same worldwide.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>18. Twin pregnancies are considered &quot;high risk.&quot;</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>19. Identical twins are always the same height.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
<tr>
<td>20. Fraternal twins have more genes in common than regular siblings.</td>
<td>TRUE</td>
<td>FALSE</td>
<td>DON'T KNOW</td>
</tr>
</tbody>
</table>
Appendix C
Demographic Questionnaire

Please answer the following questions about yourself and twins you know.

1. Are you a twin? YES or NO
   If so, are you monozygotic (identical) or dizygotic (fraternal)? Not Sure
   If you are a fraternal twin is your co-twin male or female?

2. Are you a “multiple” (triplet, quadruplet, etc.)? YES or NO
   If yes, describe the gender makeup of your set.

3. Are any of your siblings twins? YES or NO
   If so, are they monozygotic (identical) or dizygotic (fraternal)? Not Sure
   If they are fraternal, are they both the same sex? YES or NO

4. Are any other members of your immediate family twins? YES or NO
   If so, are they monozygotic (identical) or dizygotic (fraternal)? Not Sure

5. Are any members of your extended family twins? YES or NO
   If so, are they monozygotic (identical) or dizygotic (fraternal)? Not Sure

6. Are any of your friends twins? YES or NO
   If so, are you friends with both twins? YES or NO
   Is your friend identical (monozygotic) or fraternal (dizygotic)? Not Sure

7. Discussion of or information about twins has been a major topic in courses I have taken. (1=strongly disagree, 5=strongly agree)

    1    2    3    4    5

8. How many sets of twins do you know? (circle one answer)
   a. 0
   b. 1
   c. 2
   d. 3
e. 4
f. 5
g. 6
h. 7
i. 8
j. 9
k. 10 or more

Complete this section for *each* twin you know:

<table>
<thead>
<tr>
<th>Age and gender of twin</th>
<th>Identical or Fraternal?</th>
<th>What is your relationship to them?</th>
<th>On a scale of 1 to 7 (1=not close, 7=very close), rate how close you are to this twin</th>
</tr>
</thead>
</table>
Appendix D

IRB Approval Letter

November 28, 2011

Becki Apseloff
3434 Monteith Ave.
Cincinnati, OH 45208

Dear Ms. Apseloff:

Re: Protocol #1126, Knowledge and Attitudes about Twins

The IRB has reviewed the materials regarding your study, referenced above, and has determined that it meets the criteria for the Exempt from Review category under Federal Regulation 45CFR46. Your protocol is approved as exempt research, and therefore requires no further oversight by the IRB.

If you wish to modify your study, including the addition of data collection sites, it will be necessary to obtain IRB approval prior to implementing the modification. If any adverse events occur, please notify the IRB immediately.

Please contact our office if you have any questions. We wish you success with your project!

Sincerely,

Morell E. Mullins, Jr., Ph.D.
Chair, Institutional Review Board
Xavier University

MEM/sb

c: Kathleen Hart, advisor
Table 1

**Participant Characteristics (N = 326)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at time of survey (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 18</td>
<td>2</td>
<td>&lt;1</td>
</tr>
<tr>
<td>18-24</td>
<td>311</td>
<td>95.4</td>
</tr>
<tr>
<td>25-34</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>35 and up</td>
<td>4</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>126</td>
<td>38.7</td>
</tr>
<tr>
<td>Female</td>
<td>195</td>
<td>59.8</td>
</tr>
<tr>
<td>Missing data</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>267</td>
<td>82</td>
</tr>
<tr>
<td>Black</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>Asian Pacific Islander</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Multiracial/other</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Decline to respond</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Missing data</td>
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<td>2</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>55</td>
<td>17</td>
</tr>
<tr>
<td>Sophomore</td>
<td>84</td>
<td>26</td>
</tr>
<tr>
<td>Junior</td>
<td>120</td>
<td>37</td>
</tr>
<tr>
<td>Senior</td>
<td>56</td>
<td>17</td>
</tr>
<tr>
<td>5th year</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>6th year</td>
<td>2</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Missing data</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Birth Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Twin</td>
<td>306</td>
<td>94</td>
</tr>
<tr>
<td>Twin</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>Twin Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identical</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Fraternal</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>Item</td>
<td>Factor loading</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 1: Negative Attitudes About Twins</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. In twin pairs, one is good and one is evil.</td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td>5. Twins are more likely to have psychological problems than non-twins.</td>
<td>.47</td>
<td></td>
</tr>
<tr>
<td>9. Twins should be called the same name, or referred to as “the twins.”</td>
<td>.63</td>
<td></td>
</tr>
<tr>
<td>10. Twins are mischievous.</td>
<td>.55</td>
<td></td>
</tr>
<tr>
<td>12. Twins have troubled marriages.</td>
<td>.68</td>
<td></td>
</tr>
<tr>
<td>14. Mothers of twins usually have used fertility drugs.</td>
<td>.45</td>
<td></td>
</tr>
<tr>
<td>17. Knowing the birth order of twins is important.</td>
<td>.34</td>
<td></td>
</tr>
<tr>
<td>40. Twins make life easier for parents.</td>
<td>.51</td>
<td></td>
</tr>
<tr>
<td>42. Twins have trouble in school.</td>
<td>.58</td>
<td></td>
</tr>
<tr>
<td>45. Twins should be dressed alike.</td>
<td>.54</td>
<td></td>
</tr>
<tr>
<td>55. Twins make me uneasy.</td>
<td>.81</td>
<td></td>
</tr>
<tr>
<td>56. Twins are a bad omen.</td>
<td>.86</td>
<td></td>
</tr>
<tr>
<td>57. Twins are not as smart as non-twins.</td>
<td>.81</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2: Positive Attitudes About Twins</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Twins are better at sharing than singletons.</td>
<td>.36</td>
<td></td>
</tr>
<tr>
<td>26. Twins are special.</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>27. I wish I were a twin.</td>
<td>.46</td>
<td></td>
</tr>
<tr>
<td>29. I would like to be friends with a twin.</td>
<td>.51</td>
<td></td>
</tr>
<tr>
<td>30. I would like to have a twin as a roommate.</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>34. Twins are cute.</td>
<td>.57</td>
<td></td>
</tr>
<tr>
<td>36. I would like to have twins.</td>
<td>.56</td>
<td></td>
</tr>
<tr>
<td>37. Twins are charming.</td>
<td>.69</td>
<td></td>
</tr>
<tr>
<td>43. Twins are good at sharing and cooperating with each other.</td>
<td>.36</td>
<td></td>
</tr>
<tr>
<td>47. I like twins.</td>
<td>.56</td>
<td></td>
</tr>
<tr>
<td>Measure</td>
<td>Knowledge About Twins</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>Positive Attitudes</td>
<td>$r(306) = .17, p = .002$</td>
<td></td>
</tr>
<tr>
<td>Negative Attitudes</td>
<td>$r(306) = -.14, p = .01$</td>
<td></td>
</tr>
<tr>
<td>Number of twin pairs known</td>
<td>$r(304) = .13, p = .03$</td>
<td></td>
</tr>
<tr>
<td>Degree of relationship closeness</td>
<td>$r(296) = .07, p = .24$</td>
<td></td>
</tr>
</tbody>
</table>
Table 4
*Relationship Between Measures and Attitudes About Twins*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Positive Attitudes</th>
<th>Negative Attitudes</th>
</tr>
</thead>
<tbody>
<tr>
<td>KATS</td>
<td>$r(306) = .17, p = .002$</td>
<td>$r(306) = -.14, p = .01$</td>
</tr>
<tr>
<td>Number of twin pairs known</td>
<td>$r(304) = .18, p = .002$</td>
<td>$r(304) = .005, p = .93$</td>
</tr>
<tr>
<td>Degree of relationship closeness</td>
<td>$r(296) = .27, p = .001$</td>
<td>$r(296) = .03, p = .60$</td>
</tr>
</tbody>
</table>
Table 5
Correlations Between Scores on Knowledge and Attitudes About Twins and Relationship Closeness

<table>
<thead>
<tr>
<th>Measure</th>
<th>Degree of relationship closeness rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. KATS</td>
<td>$r (296) = .07, p = .24$</td>
</tr>
<tr>
<td>2. BATS (negative attitudes)</td>
<td>$r (296) = .03, p = .60$</td>
</tr>
<tr>
<td>3. BATS (positive attitudes)</td>
<td>$r (296) = .27, p = .001$</td>
</tr>
</tbody>
</table>
Table 6

*Differences Between Twins and Non-Twins on Measures of Knowledge and Attitudes About Twins*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Twins</th>
<th>Non-Twins</th>
<th>t(324)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>KATS</td>
<td>10.50</td>
<td>9.50</td>
<td>1.42</td>
<td>.16</td>
</tr>
<tr>
<td>BATS (negative)</td>
<td>30.30</td>
<td>28.97</td>
<td>0.72</td>
<td>.47</td>
</tr>
<tr>
<td>BATS (positive)</td>
<td>36.55</td>
<td>31.47</td>
<td>3.76</td>
<td>.00</td>
</tr>
<tr>
<td>KATS Item</td>
<td>Frequency of Correct Response</td>
<td>Percent of Participants with Correct Response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Twins run in families.</td>
<td>46</td>
<td>14.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Twins skip a generation.</td>
<td>74</td>
<td>22.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Because they are part of the same pregnancy, twins are biologically different than singletons.</td>
<td>87</td>
<td>26.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Twins are becoming less common.</td>
<td>162</td>
<td>49.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Twins always have the same mother.</td>
<td>288</td>
<td>88.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Fraternal twins occur when two separate eggs are fertilized.</td>
<td>254</td>
<td>77.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Twins always have the same father.</td>
<td>103</td>
<td>31.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Identical twins occur when one fertilized egg divides.</td>
<td>277</td>
<td>85.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Most twins are identical.</td>
<td>178</td>
<td>54.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Boy/girl twins are identical.</td>
<td>259</td>
<td>79.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Identical twins have the same fingerprints.</td>
<td>207</td>
<td>63.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Fraternal twins have the same DNA.</td>
<td>224</td>
<td>68.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Older women are more likely to have twins.</td>
<td>57</td>
<td>17.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Most twin pregnancies are the result of fertility treatments.</td>
<td>109</td>
<td>33.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
15. Twins can have different gestational ages (i.e. egg can be fertilized at different times).

16. Twins are more likely to be left handed than singletons.

17. The rate of twinning is the same worldwide.

18. Twin pregnancies are considered "high risk."

19. Identical twins are always the same height.

20. Fraternal twins have more genes in common than regular siblings.
Summary

Title: Knowledge and Attitudes About Twins

Introduction: Twins have played an important role in scientific research, as twins (especially identical twins) provide a means to study difficult to research processes in medicine, psychology, sociology and human development. The use of twins in research is often referred to as the “twin method” and the creation of this method is attributed to the work of Sir Francis Galton who viewed twins as the key to distinguishing between the effects of heredity and later life experiences (Smilansky, 1992; Stewart, 2000b). The vast majority of systematic research on twins has focused on abnormal or pathological aspects of adjustment, often whether or not both twins will express a particular pathology. Whereas many forms of pathology have been studied using the “twin method”, there has been little research on non-pathological features of twin development or an examination of the effect of social expectations placed on twins. Despite this paucity of systematically-derived knowledge, there is a plethora of books and popular articles about twins, the twin experience, and advice about raising twins. More recently, interest has increased in the study of twins for the sake of studying their unique experiences, and identifying risk and protective factors for twins.

Both systematic studies (e.g., Bacon, 2006) and other writings about twins cite a number of assumptions about twins that are incorrect. For example, several sources (e.g., Smith, Renshaw & Renshaw, 1968; Stewart, 2000a, 2000b) indicate that many people think that the majority of twins are identical and same-sexed. Bacon (2006) interviewed twins and their families and found that mixed-sexed twins reported that most people did not
consider them to be twins; Stewart (2000b) found that the majority of twin parents she
interviewed were most frequently asked if their twins were identical. Consistent with the
misconception that most twins are identical is the finding that people tend to overestimate
the prevalence of identical twins (e.g., Preedy, 1999).
In light of the limited systematic study of perceptions of twins, the aim of the current
study was to gather information about the ways individuals' perceive twins and their
experiences as well as to identify assumptions that are made about twins and level of
knowledge about twins.

Method: Participants were 326 undergraduate students enrolled in psychology courses at
a private, medium sized university in the Midwest. 20 participants were twins. Data was
collected via SurveyGizmo using the Beliefs About Twins Scale (BATS) a measure of
attitudes about twins that was developed by the researchers, the Knowledge About Twins
Scale (KATS) a measure of knowledge about twins developed by the researchers, and a
demographic information section.

Findings: A series of correlations and independent samples t-tests were conducted.
There was not a significant difference between participants' positive and negative
attitudes about twins. There was a statistically significant correlation between participants
positive attitudes about twins and their knowledge about twins. Relatedly, there was a
statistically significant correlation between lower knowledge about twins and negative
attitudes about them. A significant correlation was found between individuals' knowledge
about twins and the number of twins they were acquainted with. Positive attitudes were
also significantly correlated with number of twin pairs known to the respondent and with
rated degree of closeness to twin pairs. An independent samples t-test revealed that
compared to non-twins, twins have more positive attitudes about twins. Finally, a
frequency analysis of participants' responses to the KATS revealed that, in general,
participants were familiar with basic information about twins, but were less
knowledgeable about less frequently reported information about twins.

Implications: Although our results do not indicate that general attitudes about twins are
either positive or negative, our findings suggest that familiarity with and closeness to
twins is related to knowledge about twins as well as positive attitudes about twins.
Individuals' who participated in this study were relatively familiar with general factual
knowledge about twins (e.g. the difference between identical and fraternal twins), but
were less familiar with less frequently cited facts about twins (e.g. that twins are more
likely to be left-handed). This suggests that, overall, increased contact and familiarity
with twins and information about them may reduce negative attitudes, misconceptions or
stereotypes about twins.