An updated picture of women’s role in local television weather broadcasting was pursued in this study through the analysis of the genders, positions, and educational backgrounds of local TV weathercasters in the United States. The study examined whether women’s representation increased in the mid-2010s as the number of females graduating with meteorology degrees rose in the preceding decade (Wilson 2013). It also explored related topics including the distribution of genders and degreeed meteorologists across TV markets. The objectives were

1) to determine updated numbers that reflect whether women are gaining more positions and influence in local TV weather broadcasting compared with the past;
2) to determine how many female weathercasters hold meteorology degrees compared with male weathercasters, which is a largely unstudied topic;
3) to find whether a correlation exists between genders and common positions in broadcast meteorology such as chief meteorologist and evening, morning, and weekend positions; and
4) to find whether a correlation exists between having a meteorology degree and working in a larger and often higher-paying market.

Gathering and analyzing this information helped form an updated view of women’s presence in local TV weather.

LITERATURE REVIEW. Existing literature has examined the role of female weather broadcasters in local U.S. television and contains relevant information on women’s representation in broadcast meteorology and degrees held by weathercasters, which relate to the first three objectives of this study. The percentage of women in local television weather positions hovered at a quarter or less over the past 20 years; numbers varied slightly with different surveys. The percentage of women weathercasters was
25% in a 2017 survey on climate change (Maibach et al. 2017), which was higher than the 18% found in 2011 (Maibach et al. 2011) and 21% found in a 2005 survey of newsroom demographics (Papper 2005). These numbers are not much higher than in the 1990s, when women made up 19% of weathercaster positions in 1999 (Malone 2011) and comprised just 15% in the sample from a news study in 1997 (Wilson 2008). In the 1980s, women accounted for just 12% of weathercaster positions in a survey of the top 40 television markets (Lazalier 1982). Low percentages for females also apply to the broader field of meteorology, both broadcast and nonbroadcast, where women recently made up 15% of all professional employment in atmospheric sciences (Gonzales 2010).

Not only did women hold a relatively small percentage of weathercaster spots, but a majority of them filled the generally less desired and less influential weekend position. In the Wilson (2008) study, more than half the women working in television weather worked the weekend shift, while only a quarter of them held prime-time shifts. Women’s portion of chief meteorologist positions was even smaller at just 10%–12% (Malone 2011).

This low representation of women weathercasters persisted into the 2010s even as women’s presence increased in other positions in television news. In 2016, the number of women news directors hit a record high at 33%, and 44% of newsroom staffs were made up of women (Papper 2016). Women sportscasters gained a greater presence at near 19% in 2011, and broadcast meteorology programs such as those at The Pennsylvania State University and Mississippi State University reported a higher proportion of females in recent years at between 30% and 40% (Malone 2011). As women’s representation increased in other areas, females still claimed only a small part of local television weather, which is the major driving force behind local news shares and ratings. Viewers have consistently chosen weather as their top reason to watch local newscasts; weather consultants have said weather is repeatedly the generally less desired and less influential weekend position. In the Wilson (2008) study, more than half the women working in television weather worked the weekend shift, while only a quarter of them held prime-time shifts. Women’s portion of chief meteorologist positions was even smaller at just 10%–12% (Malone 2011).

While this study did not address stereotypes, the following brief discussion provides context that may be relevant but is not established. The relatively small percentage of women in television weather could be related to the negative “weather girl” stereotype that dates back to the 1950s. In that decade, women held most weathercaster positions (Henson 2002), as station managers aimed to boost ratings by hiring sexualized females who often had no science education (Turner 2009). Women were sometimes sexualized to the point of wearing bathing suits during their weather forecasts (Henson 2010). Even when female weather anchors were not blatantly sexualized, their weather reports often centered on themes other than hard science, such as outfit choice or gimmicks like writing forecasts while standing behind a see-through wall (Henson 2010).

Serious, credible female meteorologists on TV became more common by the 1970s and 1980s, but the uneducated and sexualized weather-girl stereotype originating from the 1950s persists in the present day. In films and television shows in the late 1990s and 2000s, filmmakers portrayed women weathercasters as less intelligent, less educated, noticeably sexualized, and dependent on men (Perryman and Theiss 2014). The stereotype appears to apply to some extent to female scientists in other fields as well. In a study of how scientists were portrayed in films and television shows, less than one-fifth of professional scientist characters were women. Female scientist characters were also subordinate to male scientists and dependent on male characters (Flicker 2003). In a study on children’s programming, females made up only 16% of characters with a career in science, technology, engineering, or mathematics (Smith et al. 2012).

In the exploration of women’s underrepresentation in TV weather, a related critical consideration is the difference in perceived credibility of men versus women on the news. In a 2010 study, males scored higher in perceived credibility compared with females when both male and female newscasters delivered the same 30-second news story. Viewers in the study expected male newscasters to handle serious news situations better than female newscasters and to be less emotional than women in their delivery of serious news (Brann and Himes 2010). As female meteorologist Janice Huff stated, “A lot of people think something coming from a man’s mouth is more authoritative. I still think that happens in society—people like it better if a man says it” (Malone 2011).

Similar expectations appear to extend back several decades and apply to other media such as voice-over commercials and films. In the 1970s, the British Broadcasting Corporation (BBC) refused females newsreader jobs because their voices were too high or lacked authority (Gill 2000). A Screen Actors Guild study refuted that notion in a 1986 survey that showed a woman’s voice sold products as well as a man’s in voice-over commercials (Sanders and Rock 1994). Still, males dominate many areas of the voice-over industry nearly 30 years later (Robb 2015). In top-grossing films from 2014 and 2015, only 17% featured a female lead, and male characters spoke twice as often as females (Narayanan et al. 2016).
While credibility can be subjectively perceived and rated like in Brann and Himes’ study (2010), it also relates to the less subjective criteria of education and qualifications. No study has directly compared the educational backgrounds of male versus female weathercasters, but Wilson’s (2008) survey looked at the degrees attained by television weathercasters in general, both male and female. A little more than half (56%) of weathercasters said their highest degree was in meteorology or atmospheric science, and 52% identified themselves as meteorologists. In the same survey, more than two-thirds of television weathercasters held some sort of science degree, while almost a quarter had degrees in journalism or mass communication (Wilson 2008). One of the goals of this study was to update these percentages and break down the results by gender.

Constructs including the weather-girl stereotype and gender-based differences in perceived credibility could potentially contribute to the percentage of women in broadcast meteorology remaining low, especially in chief and evening positions. Related facets of the issue remained to be studied and updated for the mid-2010s. Have more women entered the field? Do women hold prominent positions or are still most working weekend shifts? Do as many women hold meteorology degrees compared with men, and do highly desired jobs in large markets go to weathercasters who earned a meteorology degree? This study aimed at finding quantitative data to help answer these questions.

**METHODOLOGY.** Data on local weathercasters were collected from local television station websites across the United States. A list of local network affiliates and regional cable channels in the existing 210 markets in the United States was compiled based on Nielsen market rankings and the website NewsBlues (www.newsblues.com/), which provides updated lists of stations for each market. Individual weathercaster biography pages found on the websites of each of the local stations in all 210 markets were accessed and examined.

Local television stations typically provide the information desired for this study in short biographies of their news and weather team members on their station websites. These website bios were the sole source of information included in this study. For the most part, this information was readily obtainable from the station websites, since local television stations are generally eager to promote their lineup of on-air talent and keep newscaster bios reasonably up to date.

Data in the bios including the market number, name, gender, education, and position of each weathercaster were recorded. The weathercasters’ educations were broken down into categories including an undergraduate degree in meteorology, a master’s degree or Ph.D. in meteorology, a degree in communication or journalism, a degree in another science besides meteorology (such as geography or chemistry), a degree in another discipline, or an educational certificate such as a certificate in broadcast meteorology from Mississippi State University. It was also noted if the weathercaster was currently working on a meteorology degree or had taken some additional courses in meteorology. For the purposes of this study, a meteorology degree was considered to include any undergraduate degree, master of science, or Ph.D. in meteorology or atmospheric science, including geoscience or climatology degrees with concentrations in meteorology. Minors in meteorology and certificates from broadcast meteorology programs were not considered to be meteorology degrees. Positions were broken down into categories including evening, morning, weekend, and daytime shifts. Genders were determined by viewing the weathercasters’ photos and noting context clues in the bio texts, such as pronouns like “he” or “she.” In all cases, a specific gender of either male or female was immediately obvious.

Based on a comprehensive scholarly literature review, this is, to my knowledge, the largest biographical study of television weathercasters to date. All U.S. local weathercasters in all 210 markets who were represented with a bio page on their respective station websites were counted in this study. The data represent 1,444 males and 596 females for a total of 2,040 weathercasters. This number is presumed to be very close to or exactly the size of the population, since this data collection method was thorough by design, especially compared with other data collection methods such as surveys. All data were obtained between 27 February and 20 October 2016.

While the official station websites provided much of the desired data, there were instances of missing data, such as when a bio page did not state the weathercaster’s position or education. In these cases, the weathercaster’s market number, name, and gender were recorded, but no other data were registered for that weathercaster. Data were counted as missing when bios contained very little or no text, when the desired information was simply not mentioned in the bios, and when wording was too vague to conclusively state the weathercaster’s position or education. Of the 1,444 males, information on position was missing for 483 weathercasters (33%), and information on education...
was missing for 263 weathercasters (18%). Of the 596 females, information on position was missing for 225 weathercasters (38%), and information on education was missing for 71 weathercasters (12%). When looking at smaller versus larger markets, missing data percentages were similar. In the top 100 markets, there were 483 instances of missing data on position out of a total 1,381 weathercasters (35%), and there were 211 instances of missing data on education (15%). In markets 101–210, there were 220 cases where data on position were missing out of a total 659 weathercasters (33%) and 122 cases where data on education were missing (19%). After data were compiled and inspected, it was apparent that some weathercasters were listed twice attached to two different stations, indicating they may have switched markets for new positions at some point in the 8-month data collection window. In the 30 cases in which weathercasters were listed twice, the entry attached to the larger market was kept, and the entry for the smaller market was discarded so that only one entry remained for each weathercaster.

Data were entered into Microsoft Excel, and various numbers and percentages were calculated. Chi-squared tests were completed in Microsoft Excel to find if associations existed between genders and positions as well as genders and meteorology degrees.

RESULTS. The percentage of female weathercasters in the 210 local television markets in the United States was 29% compared with 71% for male weathercasters. The percentage of female weathercasters who held meteorology degrees was 52% compared with 59% of males; a chi-squared test revealed the difference to be statistically significant ($p < 0.01$). When both sexes were combined, 57% of all weathercasters held meteorology degrees. Meteorology undergraduate degrees were the most common educational background for both males and females (Fig. 1). Some weathercasters specified more than one degree, so the numbers in Fig. 1 are higher than the actual number of males and females in this study.

For women whose bios included a specific position, most worked weekend shifts; 44% of female weathercasters worked weekends, while 37% worked mornings, 14% worked evenings, and 5% worked daytimes (Fig. 2). Just under 11% of all weathercasters who said they worked an evening shift were female. Most of the men who specified their positions in their bios worked evening time slots; 45% of male weathercasters worked evenings, 28% worked mornings, 23% worked weekends, and 4% worked daytimes (Fig. 3). Positions are shown broken down by gender in Fig. 4. Of the weathercasters who said they were a chief meteorologist, 8% were female (Fig. 5).

Chi-squared tests revealed statistically significant associations between males and all shifts, including very strong associations between males and evening positions, as well as between males and chief
meteorologist positions ($p < 0.01$). A chi-squared test showed a very strong association between weathercasters of both sexes who had meteorology degrees and chief meteorologist positions ($p < 0.01$).

For both males and females, meteorology degrees were more common in smaller markets compared with larger markets. About 47% of females had meteorology degrees in markets 1–100, while 56% had meteorology degrees in markets 101–210. About 52% of males had meteorology degrees in markets 1–100, while 61% had meteorology degrees in markets 101–210 (Fig. 6). A greater percentage of females were found in larger markets: the percentage of female weathercasters was 39% in the top 10 markets and 38% in the top 25 markets, which was considerably higher than the percentage for all 210 markets of 29%. In smaller markets from 101 to 210, the percentage of female weathercasters was lower at 24%. A greater percentage of males was found in smaller markets from 101 to 210, where they made up 76% of weathercaster positions, compared with 62% in the top 25 markets.

**DISCUSSION.** The percentage of female weathercasters was higher in this study at 29% compared with 25% or less found in previous surveys. This indicates an increase in female presence in weathercaster positions, which corresponds to the increase in females in broadcast meteorology programs in the past decade (Malone 2011). The relatively low number compared to males is not surprising, given that the entire field of meteorology skews male (Gonzales 2010), nor is it worse than in some other media such as voice-over and film, as discussed in the literature review.

The percentage of females in evening or prime-time shifts was lower in this study, at just under 11% compared to nearly a third in the Wilson (2008) study. The percentage of female chief meteorologists was lower, at just 8% compared to a subjective estimate of 10%–12% noted by Malone (2011). These results suggest a possible decline in females’ representation in what is considered the most prominent and high-ranking title for weathercasters. Most women in local broadcast meteorology
did indeed work weekend shifts; this was unchanged from results found in the Wilson (2008) study. This confirms that women are still most represented in the typically least desired and least prestigious time slot. Additional research is needed to address why so many women work weekend shifts while so few claim chief or prime-time roles. Potential factors include the possibility of persistent sexism in hiring practices and the chance that women choose to work weekends because of family reasons or personal preference. Another possibility is that women may choose to exit the industry earlier in their careers, leaving males to dominate the pool of older, more experienced weathercasters who usually fill chief positions.

One focus of this study on which virtually no previous research had been conducted was finding how many female weathercasters hold meteorology degrees compared to their male counterparts. The results showed significantly fewer female weathercasters possessed meteorology degrees compared to males: 52% of females compared to 59% of males held an undergraduate degree, master of science, or Ph.D. in meteorology or atmospheric science. It is possible that this factor could contribute to the persistence of the weather-girl stereotype in which females are characterized as less educated and less competent (Perryman and Theiss 2014), since viewers see fewer degreed female weathercasters on television compared to males. However, the difference between 52% and 59% may not be large enough to influence the resilience of the weather-girl stereotype; since most markets have 16 or fewer weathercasters, the 7% difference in males and females with meteorology degrees may not be discernable when looking at a single market. Further research should investigate why fewer female weathercasters hold meteorology degrees. Potential reasons to explore include the possibility of sexism in hiring practices if managers have different criteria for female versus male weathercasters; perhaps managers place a higher value on meteorology degrees for men compared with women. Another possible cause is that fewer degreed female meteorologists may be applying for on-air weathercaster positions, perhaps because of difficult or undesirable hours often associated with television news. Additional research could also address the effect of criticism from consultants and social media, as broadcasters must deal with frequent critiques of their appearances and performances, including rude or offensive comments from Internet “trolls”; these factors may be worse for females (Shepherd 2016) and perhaps discourage more degreed females than males from entering or continuing in the industry.

Not surprisingly, the very strong associations found in chi-squared tests reflect the connection between males and evenings, as well as males and chief meteorologist positions. The number of males was higher than females in every position (Fig. 5), and significant associations were also found between males and mornings and between males and weekends. Even though weekends were the most common time slot among females, the actual number of females in weekend shifts was 162, which

![Fig. 5. The percentage of males and females in chief meteorologist positions.](image)

![Fig. 6. The percentage of weathercasters with meteorology degrees broken down into larger markets (1–100), smaller markets (101–210), and all 210 markets.](image)
was still lower than the 221 males in weekend shifts. Since the overall number of males in the study was so much higher than females (1,444 males compared with 596 females), the relatively lower number of women in weekend shifts still accounted for 44% of the women who specified their positions in their bios.

An unexpected result was that more weathercasters of both sexes had meteorology degrees in smaller markets compared with larger markets. It seems plausible that meteorology degrees would be more common in larger, often better-paying markets where qualifications would be assumed to be stricter. One possible cause for the opposite result found in this study is that larger markets could possibly favor weathercasters who have strong positive attributes other than having a meteorology degree, such as personality, attractiveness, chemistry with other newscasters, or parasocial interaction (PSI), the notion that viewers develop relationships with weathercasters (Sherman-Morris 2005) almost as if they were face to face or know them personally (Horton and Wohl 1956). The field may also be moving toward professionalization: younger weathercasters are generally expected to have meteorology degrees, and it is possible this effect has not yet reached larger markets where weathercasters are often older and more experienced. Information on ages of weathercasters would help clarify this issue, but only data clearly stated in website bios were recorded for this study; age information was almost never mentioned in bios and therefore was not examined. It appeared the lower number of meteorology degrees in larger markets might perhaps stem from weathercasters choosing to highlight their work experience instead of education in their bios, especially if their experience was more impressive or interesting. However, this possibility was not likely considering most weathercasters (85%) in larger markets did mention their educations, and they mentioned them slightly more often than weathercasters in smaller markets (81%).

The data collection method of gathering weathercaster data from station websites offered some great benefits in terms of its comprehensive view of weathercasters, its reliance on publicly available data, and the wealth of information provided in online bios that is not normally used in studies of this kind. The method worked for finding the market numbers, names, and percentages of females and males in weathercaster positions. However, the design of this study had a few limitations. It sometimes failed to provide all the information desired for each weathercaster when information was either absent from the bio or when wording was too vague to conclusively categorize positions or educations. Data on positions were missing for 35% of the weathercasters, while missing information on education was less frequent at 15%. It is not clear why bios lacked information on positions so much more often than on education. Perhaps weathercasters omitted their positions from their bios assuming most viewers would already be familiar with their usual time slots.

It is possible some results may be biased because of the use of website bios rather than other sources. Meteorologists with lower-status shifts such as weekends may have purposely omitted their specific shifts from their website bios to highlight their more marketable traits, while chief meteorologists may have been more likely to include their prestigious title in their bios. Numbers seemed to reflect this: 413 weathercasters identified as chief meteorologist, 479 said they worked evenings, 407 said they worked mornings, and 384 said they worked weekends. The lower number for those identifying as the weekend weathercaster suggests weathercasters with lower-status positions may have been slightly underrepresented. This potential bias was not as apparent for those with less impressive educational backgrounds. It should be noted that the 57% of both male and female weathercasters who held meteorology degrees matches closely with the 56% found in Wilson’s (2008) survey; this suggests that any bias with underrepresentation of less qualified weathercasters may not have fluctuated much between the two studies. Determining how many meteorologists hold the certified broadcast meteorologist distinction could have provided additional insight; however, this metric was not included in this study. Some error could have resulted if the station websites were not updated or contained mistakes. For example, a meteorologist may have recently been promoted from a weekend shift to an evening shift, but the station website may not have been updated to reflect the change. Since most television stations actively promote their lineup of news and weather talent, it was hoped that website information was as current and accurate as possible and that this kind of error was kept to a minimum.

CONCLUSIONS. The findings suggest that even though the overall percentage of female weathercasters appears to have increased, females hold fewer high-ranking positions compared with previous studies. Additional research should explore if factors such as persistent sexism in hiring practices or women’s personal choices could explain why fewer female weathercasters have degrees and why women work weekend shifts while remaining underrepresented in chief meteorologist and evening positions.

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