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## Selective Exposure and Exemplification within Sports Highlights

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### ABSTRACT

Selective exposure provides a useful lens for exploring how attention to competing information within exemplification theory (i.e., exemplars versus base-rate data) can impact viewing outcomes. Sports highlights reflect an ideal context for examining this selectivity, as exemplars are often presented concomitantly alongside base-rate measures of performance. To examine this selectivity, an experiment was conducted where viewers watched a series of exemplars (or sports highlights) presented alongside statistical measures of athlete performance while eye tracking gauged visual attention. Although viewers allocated greater overall attention to exemplars, domain-specific interest predicted increased attention to base-rate data, which in turn was associated with increased recall. This relationship was moderated by viewers' actual, objective sport knowledge.

## Selective Exposure and Exemplification within Sports Highlights

On screens both large and small, media interfaces continue to become more complex, from television news (Bergen et al., 2005; Brechman et al., 2015) to social media portals that contain multiple streams of information competing for attention (Vraga et al., 2016). The visual complexity typical of much contemporary media consumption invites selectivity in terms of both the specific message elements or broader categories of information that individuals choose for deeper processing, which in turn impacts viewing outcomes. One useful theoretical framework for examining how individuals form perceptions about events or phenomena through media exposure is exemplification theory (Brosius

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& Bathelt, 1994; Zillmann, 1999). The theory holds that media coverage of any issue or event is typically characterized by two types of information: *exemplars*, or selected representations of an issue or phenomenon, versus *base-rate information*, or objective, quantitative summaries of that phenomenon.

Research has generally established the superior influence of exemplars over base-rate data (Bigsby et al., 2019; Krämer & Peter, 2020). One explanation for such effects is that audiences exercise differential attention to these two information types during consumption (Brosius & Bathelt, 1994), and some have asserted that media consumers “ignore” base-rate data when making judgments (Christensen-Szalanski & Bushyhead, 1981; Koehler, 1996; Nisbett & Borgida, 1975; Tran, 2012). This is ostensibly an empirical question, and eye tracking has emerged as a useful approach for testing this assertion by directly assessing selective exposure, as it can provide a precise measure of visual attention to competing information streams in a single media interface (Marquart et al., 2016; Schmuck et al., 2020; Zillich & Guenther, 2021).

Contrary to arguments that media consumers ignore base-rate quantifications, select genres reflect scenarios where media consumers might deliberately allocate greater attention to such information due to personal interest. For example, sports highlight shows represent a common form of programming that provides both edited summaries of highlights – or exceptional displays of athleticism that serve as exemplars – as well as statistical information that serve as summative, base-rate data on a given competition, team, or athlete (Gamache, 2010). Sports highlights also provide a context to examine visual selectivity, given that these two competing types of information are often co-presented simultaneously. The unyielding temporal aspect of video content requires that viewers selectively parse attention to these competing sources of information, and it provides a forum for examining whether consumers do, indeed, ignore pallid base-rate information in deference to more vivid exemplars. In a sport media landscape where some increasingly “buy, sell, and trade” athletes via sport fantasy leagues, base-rate quantifications are of keen interest to a growing number of sport consumers (Billings & Ruihley, 2013; Farquhar & Meeds, 2007). Thus, personal interest can yield increased attention to base-rate data as well as improved recall for such quantifications (Callison et al., 2009; Zillmann et al., 2009). The purpose of this study is to examine how individual differences in one’s topical interest crafts selective exposure to competing information types, which in turn may impact memory for base-rate quantifications.

## Literature Review

### *Exemplification Theory*

Exemplification theory identifies the complimentary nature of two types of information used in communication: exemplars and base-rate information (Brosius & Bathelt, 1994; Zillmann, 1999). Exemplars are representative cases that share an essential, defining characteristic that qualitatively represent a broader event population. Base-rate information, conversely, provides “reliable, quantitative information about the distribution of cases” (Zillmann, 1999, p. 70). For example, news reports often employ exemplars, such as emotionally potent quotes from individuals, or “man on the street” interviews meant to capture the range of opinions on an issue (Peter, 2019). Selection of exemplars can take several forms. Random selection, where exemplars are blindly drawn from the broader population of events by chance, should reflect a more representative array of cases (Zillmann, 1999). However, in selective exemplification cases are nonrandomly selected to “service the dictates of commercialism” (p. 89). In the case of advertising or other strategic communications, exemplars are selected to purposively portray an issue or event in a certain light that serves the goals of the communicator (Zillmann, 1999).

Meta-analytic summaries support the contention that exemplars have stronger effects than base-rate information on a variety of audience responses (e.g., attitudes, behavior, risk perception; Bigsby et al., 2019; Krämer & Peter, 2020). Indeed, well prior to Zillmann’s (1999) initial articulation of the theory, research demonstrated the influence of exemplars over base-rate information (Bar-Hillel, 1980; Nisbett & Borgida, 1975). These effects occur through multiple heuristics. For example, exposure to singular cases (or exemplars) influence overall judgments through the representativeness heuristic (Kahneman & Tversky, 1972). As Krämer and Peter (2020) note, “This specific form of cognitive processing leads people to generalize the attributes of a single case to the population the case is attributed to and, thus, (erroneously) to judge a few single instances to be representative for the underlying population” (p. 195). A second pathway for exemplification is the availability heuristic (Tversky & Kahneman, 1973). Compared to base-rate representations of a phenomenon, exemplars are said to be more emotionally charged, vivid representations, and as such, are more readily recalled when making judgments (Brosius & Bathelt, 1994; Dixon, 2016; Zillmann et al., 2001). Moreover, emotionally charged exemplars have greater influence on both subjective perceptions as well-selective exposure to information than less emotional exemplars (Aust & Zillmann, 1996; Knobloch et al., 2003b).

Beyond these heuristics, some propose that the superior influence of exemplars is through differences in attention to competing types of information during message consumption (Brosius & Bathelt, 1994). Indeed, Koehler

(1996) noted that some authors casually assert that individuals “ignore” base-rate data when forming judgments (e.g., Christensen-Szalanski & Bushyhead, 1981; Nisbett & Borgida, 1975; Tran, 2012). To that end, he lamented, “Some of the confusion may be attributable to the unfortunate use of the term ‘ignore’ by some investigators to describe data suggesting only that subjects attach relatively less weight to base rate information than to descriptive, individuating information” (p. 3).

### ***Selective Exposure in Exemplification***

This observation underscores the need for more precise measures of message consumption that examine how individuals actively, selectively attend to competing forms of information. Selective exposure to communication has a robust history and has explored differences in the media consumption as a function of political ideology (Knobloch-Westerwick & Meng, 2009), message characteristics (Kim et al., 2016), and affect regulation (Bryant & Zillmann, 1984; Knobloch-Westerwick, 2007). Notably, selective processes have also been explored in the context of exemplification. For example, Knobloch et al. (2003b) found that inclusion of more emotionally charged imagery (i.e., exemplars) in online news yielded greater reader selection of stories when compared with stories paired with less charged or no imagery. Likewise, Knobloch-Westerwick and Sarge (2015) demonstrated selective exposure to messages employing exemplars that described effective weight loss strategies over messages relying on base-rate information.

Although its use as a measure of selective exposure to information was noted decades ago (Donohew et al., 1972; Olson & Zanna, 1979), eye tracking has reemerged as a useful approach to gauge selectivity in how media consumers allocate visual attention during message consumption (Cummins, 2017; King et al., 2019). Whereas selective exposure often denoted selection *between* competing messages or channels, eye tracking permits measurement of intra-stimulus selective exposure to either competing message elements (e.g., individual parts of a single message) or competing messages (e.g., multiple stories on a website) *within* a single media interface. For example, studies have used eye tracking to measure selective exposure to competing political advertisements presented side by side as a function of one’s political ideology (Marquart et al., 2016; Schmuck et al., 2020), to news content and popularity cues in social media feeds (Dvir-Gvirzman, 2019; Sülflow et al., 2019; Vraga et al., 2016), as a means of resolving cognitive dissonance (Zillich & Guenther, 2021), attention to online advertising (Rieger et al., 2015), health information in online contexts (Kessler & Zillich, 2019), and information graphics in sports (Cummins et al., 2016). Thus, this approach shows potential for empirically assessing whether consumers indeed “ignore” base-rate information.

For multiple reasons, sports programming and sports highlight programs in particular represent an ideal vehicle to illustrate the benefits of eye tracking as a measure of selective exposure as well as a means of exploring exemplification effects. First, sports programming is replete with both exemplars and base-rate quantifications. As previously noted, exemplars are characterized by shared essential features across a population of events. In the context of sports, a singular athlete or team could embody the exemplified phenomenon, and the associated event population would include displays of skill across the entirety of that athlete's career or another specified period; thus, each unique event within that population could be selected as a singular illustration of ability. The representativeness heuristic would suggest that individuals draw upon these singular instances to judge the exemplified team or athlete. Base-rate data, in turn, reflect "measured and quantified assessments such as incidence proportions" (Zillmann, 2002, pp. 21–22). For example, in the case of baseball, a hitter's batting average reflects the incidence proportion (expressed as a decimal value) of successful hits per total number of at-bats/attempts. As such, this serves as an objective measure of athletic performance in contrast to the singular examples that characterize a game summary or highlight reel.

Second, sports reflects a genre where programmers engage in selective exemplification given that content producers do not randomly choose from the universe of examples of an athlete or team. Instead, they deliberately select examples that fulfill a constructed athlete narrative (Gamache, 2010). Indeed, Zillmann (2002) noted that exemplification within entertainment media "favors the exceptional over the ordinary" (p. 21). By definition, a sports highlight reel is precisely that, a nonrandom selection of singular displays of athleticism intentionally designed to craft a specific narrative (e.g., a close competition; a lopsided victory).

Consider professional baseball player Barry Bonds, who holds the all-time home run record. A career retrospective would no doubt emphasize his skill through replays of such singular exceptional feats. However, his career batting average was .298 (or 298 successful hits per 1,000 at-bats); thus, a truly representative retrospective of his career offensive performance would depict the athlete failing to get a hit more than 7 out of 10 at-bats.<sup>1</sup> Nascent research has shown that viewers form inflated perceptions of individual athleticism even when faced with potentially contradictory base-rate indicators of athlete performance due to the use of vivid, emotionally potent exemplars (D. Hahn & Cummins, 2020).

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<sup>1</sup>Per Major League Baseball's definition of batting average, this statistic does not include successful on-base attempts that result from walks, hit batsmen, etc. We kindly thank the anonymous reviewer for noting this distinction between batting average and on-base percentage.

A third reason that sports highlight programming represents an ideal vehicle for testing of potential exemplification effects is the frequent co-presentation of these competing types of information. Sports news, highlight, or talk programs often simultaneously present both exemplar and base-rate information. The unyielding temporal aspect of video requires that viewers selectively parse attention to these competing sources of information (see [Figure 1](#)). Research examining visual attention during message reception has argued that attention results from an interaction of automatic resource allocation stemming from message attributes (e.g., motion, contrast) and controlled processing resulting from perceived personal relevance, goal relevance, etc. (i.e., bottom-up versus top-down processing; Pieters & Wedel, 2004; Theeuwes, 1994). In the case of sports highlights, exemplification theory suggests that viewers would likely allocate greater visual attention to exemplars versus base-rate information due to their more vivid nature (e.g., Brosius & Bathelt, 1994; Knobloch et al., 2003b). Information processing theories such as the Limited Capacity Model for Motivated Mediated Message Processing (LC4MP; Lang, 2000) similarly suggest that viewers would allocate greater resources toward exemplars for multiple reasons, including the emotionally charged nature of highlights (e.g., Lang et al., 1999), as well as the motion reflected in exemplars relative to static base-rate data (e.g., Detenber et al., 1998). The motivated cognition perspective reflected in the LC4MP holds that individuals are biologically predisposed to automatically attend to motion to facilitate survival of the species, as motion within one's sensory environment could signal a threat or opportunity (Detenber & Lang, 2011; Simons



**Figure 1.** ESPN SportsCenter, Aug. 18, 2020, illustrating concomitant presentation of Exemplar and base-rate measures of athlete performance.

et al., 2003). Thus, viewers individuals are generally compelled to allocate greater attention to exemplars in video content due to their dynamic, moving nature.

However, sports represents a context where pallid base-rate data are particularly salient to some audiences and could invite greater sustained selective exposure. Here, goals and interests of the viewer are key, and as Knobloch-Westerwick (2015) contends, information processing models fail to account for selective processes. For example, base-rate quantifications in this context (e.g., quantifications related to athletic performance) hold no motivational relevance that could signal threat or opportunity and trigger activation of the appetitive or aversive motivational systems (Maratos & Pessoa, 2019). Research examining motivated processing has demonstrated differences in psychophysiological responses indicative of greater message processing due to message salience (e.g., team relevant v. irrelevant information) as well as personal interest (e.g., level of team identification) (Hillman et al., 2004, 2000). However, these effects were not demonstrated in an environment where competing information types were presented simultaneously, which would demand selectivity. Thus, although message characteristics such as motion may capture initial attention allocation (i.e., the orienting response; Lang, 2000), perceived personal relevance of the information can yield increased controlled resource allocation (Buijzen et al., 2010).

In the context of exemplification, research has demonstrated increased selective exposure (in the form of overall message selection) as a function of informational utility or salience (Knobloch et al., 2003a). With respect to attention to competing information types (i.e., exemplars v. base-rate data), Zillmann and his collaborators (Callison et al., 2009; Gibson et al., 2011; Zillmann et al., 2009) report a series of studies demonstrating the role of arithmetic aptitude or numeracy as an individual trait that moderates recall of base-rate information presented in media reports. They argue that because “persons with well-developed arithmetic abilities will routinely *pay more attention to* [emphasis added] numerical information and process it more vigilantly, it is expected that they also will commit it more effectively to memory and retrieve and apply it more proficiently than will persons with less-developed arithmetic abilities” (Zillmann et al., 2009, p. 399).

In the context of sport communication, fervent interest in sports statistics could yield analogous findings. Base-rate quantifications regarding athletes and competition, such as box scores, have long served as an established means of reporting on team or summarizing athlete performance (McChesney, 1989) and remain a staple of sports coverage. On-air references to player or team statistics have increased over time (Hahn et al., 2018), and this increase is also evidenced in social media (Hahn, 2019). Furthermore, statistical summaries of athlete performance have become increasingly

salient in the context of fantasy sport where individuals select athletes and rely on performance metrics to determine their own game strategy (Arth & Billings, 2020; Billings & Ruihley, 2013; Farquhar & Meeds, 2007; McGuire et al., 2012).

Such fervent interest in base-rate quantifications has the potential to shortcut the heuristic processing that undergirds exemplification effects due to higher message involvement (Brosius & Bathelt, 1994) and increased selective exposure. Bergan and Lee (2019) recently challenged the “base-rate fallacy,” or the reliance on exemplars over base-rate data when making judgments. They reported findings indicating that, contrary to much research testing exemplification effects, exemplars were not more influential than base-rate data. They reasoned that their contradictory findings may be result of the specific topic examined in their study (i.e., the Affordable Care Act, or “Obamacare”), which arguably invited closer scrutiny due to greater audience involvement. Returning to the context of sports, research has demonstrated how individuals who report greater knowledge or understanding of sports statistics pay greater visual attention to such information when presented in athletic competition (Cummins et al., 2016). However, it remains to be seen whether this selectivity moderates subsequent viewing outcomes.

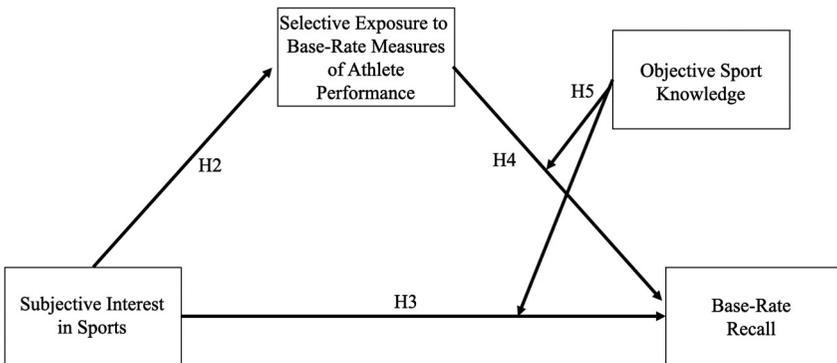
## Research Questions and Hypotheses

The present study was designed to test questions surrounding selective exposure to exemplars versus base-rate data in sports highlights and how this selectivity may then moderate memory for quantitative assessments of an exemplified athlete. These questions are broadly categorized under two groups.

First, we examine selective exposure via assessment of visual attention to base-rate information versus exemplars. Some suggest that the greater influence of exemplars results from increased attention to them due to their more vivid nature (Christensen-Szalanski & Bushyhead, 1981; Nisbett & Borgida, 1975). Moreover, information processing models suggests increased attention to exemplars due to their emotional potency as well as motion within exemplars (Detenber et al., 1998; Lang, 2000; Lang et al., 1999). Thus, we predict that viewers will allocate greater visual attention to exemplars when co-presented alongside static base-rate data (H1). Furthermore, emotionally potent or vivid exemplars elicit greater selective exposure or increased resource allocation than less potent imagery (Knobloch et al., 2003b; Lang, 2000). Analogously, attention to exemplars in sports could vary as a function of the variably dull or exciting nature of competition. Thus, we question whether the previous effect (i.e., greater attention to exemplars over base-rate data) is moderated by the exciting or dull nature of exemplars (RQ1).

The second group of questions examines how selective exposure and one's knowledge of sports moderate recall of base-rate measures of athlete performance. Although research demonstrates that exemplification effects yield superior influence of exemplars over base-rate information in terms of subjective judgments (Bigsby et al., 2019; Krämer & Peter, 2020), it remains uncertain whether memory for base-rate data is influenced or moderated via selective exposure to these types of information, which may be governed by individual differences such as topical interest (Bergan & Lee, 2019; Brosius & Bathelt, 1994). Based upon research demonstrating superior recall for base-rate data among those higher in arithmetic aptitude (Callison et al., 2009; Gibson et al., 2011; Zillmann et al., 2009), we predict that both selective exposure to and memory for base-rate data are driven by domain-specific interest, as those with greater interest in sports and sports statistics exercise greater selective exposure to in-game presentation of base-rate data (Cummins et al., 2016), and those with greater interest are better able to accurately recall base-rate data regarding athlete performance (D. Hahn & Cummins, 2020). However, while interest in sports drives attention to base-rate measures of athlete performance, objective knowledge of the sport could moderate how accurately an individual recalls base-rate quantifications (D.A. Hahn & Cummins, 2018).

Thus, we propose the following mediated moderation model (Figure 2), where subjective interest first serves to predict both selective exposure to and recall of base-rate indicators of athlete performance (H2, H3). In turn, selective exposure will also be associated with more accurate recall of objective measures of athlete performance (H4). Finally, we offer the overall mediated moderation model as our final hypothesis to argue for the crucial role of objective knowledge (H5). This model provides an explanatory mechanism whereby the effects of one's subjective interest on recall of base-



**Figure 2.** Moderated mediation model predicting recall of objective measures of athletic performance.

rate quantifications is dependent upon (or mediated by) selective exposure to specific message information (i.e., presentation of base-rate measures of athlete performance). Furthermore, the model also tests the unique or distinct role of objective knowledge via moderation of that relationship.

## Method

To address these hypotheses and research questions, an experiment was conducted where participants were recruited under the guise of evaluating a subscription service that focused on American football recruiting for the university where the research was conducted. In the experiment, individuals were randomly assigned to watch a short video that contained multiple exemplars depicting amateur footage of either highly successful or only modestly successfully displays of ability. These exemplars were shown alongside multiple objective base-rate measures of athlete performance in a split-screen format. During viewing, participants' point of gaze was recorded via eye tracking to assess selective exposure to these competing information types.

## Participants

A sample of 81 participants was recruited from an undergraduate research participant pool at a large Southwestern university. Average age was roughly 21 years ( $M = 20.74$ ,  $SD = 2.72$ ), and a slight majority was female ( $n = 50$ , 61.7%; male  $n = 31$ , 38.3%). Most participants reported their ethnicity as Caucasian ( $n = 50$ , 61.7%), with 21 identifying as Hispanic (25.9%), 6 as African American (7.4%), 3 as Asian (3.7%), and 1 person identifying as "Other" (1.2%).

## Stimuli

In keeping with the guise of the study, participants were asked to watch a one-minute video of a prospective high-school athlete who was being recruited to play football at the university. In the video, a series of exemplars (i.e., highlights) depicting the same athlete were displayed alongside 10 base-rate measures of athlete performance in a split-screen format.<sup>2</sup> Selection of footage served to operationalize factorial variance in the exciting versus dull nature of the exemplars (see Independent Variables below). Base-rate quantifications to reflect the athlete's ability included measures such as pass

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<sup>2</sup>To control for potential effects stemming from the placement of base-rate data, location of the base-rate data onscreen was varied. For half the participants, it was placed on the left of the screen and on the right for the remaining half. Assignment to experimental conditions was random.

completion percentage, average running yards per attempt, etc. To create these measures for the stimuli, data were gathered from ESPN's national ranking data of starting quarterbacks at Division I-A programs the year the stimuli were created. From the hundreds of athletes listed, the middle 10 quarterbacks' statistics were averaged for each of the 10 base-rate measures to depict an "average" quarterback.

Onset of the video was controlled by Tobii Studio research software, and videos were displayed in a full-screen format on a 21-inch computer monitor.

### **Independent/Predictor Variables**

The **exciting or dull nature of exemplars** served as a between-subjects independent variable such that the video stimulus showcased either highly successful play or only modestly successful play. Note that to preserve ecological validity of the stimuli, it was necessary to compare highly successful plays not to negative plays – which would undermine the notion of a "highlight" – but instead to more ordinary and only modestly successful plays. To select the exemplars, an initial pool of 20 events was selected from a genuine highlight compilation of a high school quarterback. In the condition featuring highly successful play, exemplars depicting the greatest yards gained were selected; the condition featuring only modestly successful exemplars featured plays depicting the fewest yards gained. To verify between-groups difference in terms of the exciting/dull nature of the exemplars, a manipulation check using an online panel of research participants ( $N = 65$ ;  $M_{\text{age}} = 25.02$  years,  $SD_{\text{age}} = 4.45$ ; male  $n = 33$ ; female  $n = 31$ ; non-binary/third gender  $n = 1$ ) recruited through Amazon's Mechanical Turks platform was conducted. In this manipulation check, participants viewed all exemplars presented in a random order via the Qualtrics online survey platform. Three attention-check items were randomly embedded within the study (e.g., "Please select 'strongly disagree' below."). After each event/play, participants rated it using two Likert-type statements, "The play I just watched was exciting," and "That play was boring" (reverse-coded), paired with 1 (*strongly disagree*) to 5 (*strongly agree*) response scales (mean  $r = .73$ ). After reverse coding, responses were averaged to compute a mean score for each exemplar. Repeated-measures ANOVA found significant between-groups differences between plays designated as exciting ( $M = 3.92$ ,  $SD = .79$ ) and modest/dull ( $M = 2.94$ ,  $SD = .68$ ),  $F(2, 64) = 93.04$ ,  $p < .001$ ,  $\eta^2_p = .59$ .

**Subjective interest in sports** was assessed using multiple measures adapted to the context of football, including sport fanship (Wann, 2002), Mavenism, and Schwabism (Billings & Ruihley, 2013; Ruihley & Billings, 2013). Wann's (2002) sport fandom questionnaire contained five items such as "I believe watching college football is the most enjoyable form of

entertainment.” Mavenism and Schwabism (Ruihley & Billings, 2013) reflect subjective perceptions of one’s sports knowledge and enjoyment of sharing that knowledge. This was measured by items such as “I know more about college football than most people,” and “I like helping people by providing them with information about college football.” Items were paired with 11-point response scales anchored with 0 (*Strongly Disagree*) and 10 (*Strongly Agree*).

Initial exploratory factor analysis (i.e., PCA) of these items suggests they reflect a single latent construct (eigenvalue = 8.84, 80.39% variance explained), with all factor loadings > .78. A confirmatory factor analysis showed generally acceptable fit for a single-factor measurement model ( $\chi^2 = 49.73$ ,  $p = .06$ ;  $\chi^2/df = 1.38$ ; RMSEA = .07; CFI = .99; TLI = .98). Thus, responses to these items were averaged to compute an overall measure of subjective sports interest ( $M = 4.33$ ,  $SD = 2.94$ , Cronbach’s alpha = .98, skewness = .76, kurtosis =  $-.46$ ).

**Objective sport knowledge** was unique from subjective interest and was assessed through a series of 20 open-ended questions that assessed procedural or historical knowledge of the sport featured in the study (D.A. Hahn & Cummins, 2018; Dietz-Uler et al., 2000). Sample items included, “How many players must be on the line of scrimmage in college football?” or “Who is the most recent winner of the Heisman Trophy?” Responses were scored as correct or incorrect, and number of correct responses was summed to create each participant’s overall knowledge score ( $M = 6.19$ ,  $SD = 4.39$ ). Responses were internally consistent using the Kuder-Richardson Formula 20 for nominal-level data (K-R 20 = .84). Summed sport knowledge scores ranged from 0 to 17 and were positively skewed (.62) and platykurtic ( $-.48$ ) but within acceptable limits (Tabachnick & Fidell, 2013).

### **Dependent Variables**

While viewing, selective exposure to base-rate versus exemplar information was measured using eye tracking (Cummins, 2017; King et al., 2019). Although technical configurations vary, the method employed here was a bright-pupil eye tracking system, which involves the illumination of discernable eye landmarks (e.g., corneal reflection and pupil center) using near-infrared light emitted coaxially with small cameras placed beneath a viewing monitor. The relative position of these eye landmarks is first assessed across a grid of stable points displayed onscreen during participant calibration. These values are then used to estimate point of gaze throughout message viewing (Jacob, 1995). A Tobii X2-60 eye tracking system was used to present stimuli in synchrony with continuous assessment of point-of-gaze. The system is noninvasive and does not differ from typical computer use.

In the study, participants sat approximately 24" from a computer display. Raw point-of-gaze was sampled at 60 Hz and processed offline to generate summary measures of selective exposure. This was achieved by drawing graphical boundaries, or areas of interest (AOIs), within the video stimuli around these competing types of information via research software. Thus, selective exposure was operationalized via separate measures of time (in seconds) looking at adjacent areas onscreen containing base-rate ( $M = 4.28s$ ,  $SD = 3.40$ ) and exemplar ( $M = 28.13s$ ,  $SD = 10.39$ ) information.

After viewing, participants responded to posttest self-report measures of memory for base-rate information. Memory for the 10 objective measures of athlete performance was measured by having participants respond to a question for each measure (e.g., "How many passing touchdowns did the player have last season?"). Questions were presented in random order via online survey software and paired with a sliding response scale. The range of the measurement scale contained the correct value as shown in the study stimuli, and location of the correct value varied such that the correct answer was randomly placed throughout the range of possible scores displayed on the scale. As precise recollection of the correct value for 10 distinct base-rate metrics would be a challenge, a "gist-of-the-quantity" or approximate recall measure was adopted analogous to prior exemplification research probing recall effects (Callison et al., 2009; Gibson et al., 2011; Zillmann et al., 2009). Responses were scored as correct when they were within  $\pm 5\%$  of the correct value. Observed scores ranged from 0 correct responses to 5, with  $M = 1.64$  ( $SD = 1.27$ ). The distribution of scores was positively skewed (.79) but within acceptable limits (Tabachnick & Fidell, 2013). Examination of the kurtosis value (.02) revealed a generally mesokurtic distribution.

## Results

### *Selective Exposure to Sports Highlights*

The first set of analyses examine distribution of attention to exemplar versus base-rate information when co-presented in the context of a sports highlight reel. To do this, a mixed-measures ANOVA was conducted where the two competing areas of interest within the stimulus served as the within-subjects factor and exemplar type was a between-subjects factor. Time (in seconds) spent viewing the two types of information served as the ratio-level dependent measure.

H1 predicted that viewers would allocate greater attention to exemplars relative to co-presented base-rate data. That hypothesis was supported, as the ANOVA revealed a significant effect of the area of interest,  $F(1,$

79) = 371.63,  $p < .001$ ,  $\eta^2_p = .83$ . Participants spent more than six times as much time viewing exemplars ( $M = 28.13s$ ,  $SD = 10.39$ ) compared to base-rate information ( $M = 4.28s$ ,  $SD = 3.40$ ).

The first research question asked if this allocation of attention was moderated by the exciting/dull nature of exemplars. The test found no Area of Interest X Exemplar Type interaction,  $F(1, 79) = .08$ ,  $p = .78$ .

Because of the unequal area or amount of the screen occupied by these two competing message elements, an analysis was performed on a transformed measure of visual attention where the duration data was divided by the proportion of the screen occupied by the two regions of the message. An identical ANOVA yielded parallel results,  $F(1, 79) = 517.57$ ,  $p < .001$ ,  $\eta^2_p = .87$ . Again, no Area of Interest X Exemplar Type interaction emerged,  $F(1, 79) = .07$ ,  $p = .79$ . Thus, viewers exhibited significantly greater selective exposure toward exemplars than base-rate information, and the dull or exciting nature of the exemplars had no impact on attention allocation.

### Impact of Individual Characteristics on Attention and Exemplification Effects

The second set of hypotheses sought to examine how individual characteristics worked to shape attention allocation and, in turn, downstream memory for base-rate quantifications. To examine H2-H4, variables were first examined by bivariate correlations (see Table 1) and then via a tested a mediated moderation model using Hayes (2017) PROCESS macro for SPSS to answer H5.

First, H2 predicted the association of subjective interest with visual attention to base-rate measures of athlete performance. That correlation was significant, and a simple linear regression found that subjective interest predicted attention to onscreen presentation of base-rate data ( $B = .32$ ,  $\beta = .28$ ,  $p = .01$ ). Similarly, H3 predicted that subjective interest in sports would be associated with recall of objective measures of athlete performance. Correlational analysis found a significant association between the variables,

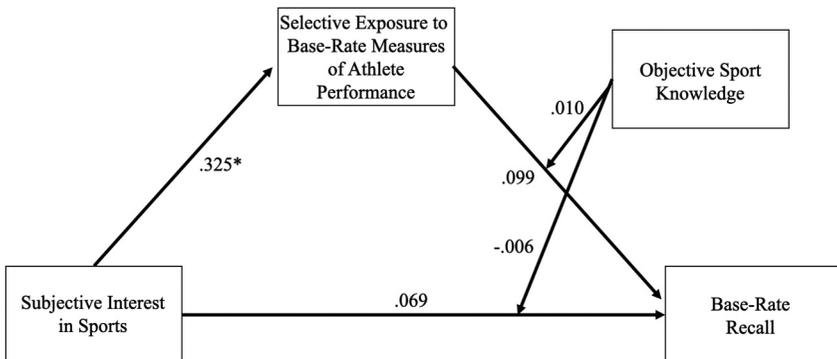
**Table 1.** Correlation matrix of study variables.

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Exemplar Type	–					
(2) Subjective Interest	.12	–				
(3) Objective Knowledge	.001	.76**	–			
(4) Attention to Exemplars (Game Play)	.03	–.08	–.11	–		
(5) Attention to Base-Rate Measures of Athlete Performance	–.02	.28*	.34*	–.04	–	
(6) Objective Recall of Base-Rate Measures of Athlete Performance	.001	.32**	.37**	–.13	.55**	–

For exemplar type, 0 = Exciting. \* $p < .05$ , \*\*  $p < .01$

and a simple linear regression found that subjective interest was a significant predictor of recall of objective measures of athlete performance ( $B = .14$ ,  $\beta = .32$ ,  $p = .004$ ). Hypothesis 4 predicted that visual attention to base-rate measures of athlete performance would be associated with recall of those objective measures of athlete performance. The correlation around a positive association, and a simple linear regression showed that visual attention was a significant predictor of recall of the objective base-rate measures of athlete performance ( $B = .21$ ,  $\beta = .55$ ,  $p < .001$ ). Thus, H2, H3, and H4 were supported.

Hypothesis 5 tested a mediated moderation model whereby subjective interest would be associated with selective exposure to base-rate quantifications, which would in turn be associated with recall of objective measures of athlete performance, but only for those at relatively high levels of objective sports knowledge. This model was tested using ordinary least-squares regression via Hayes (2017) PROCESS SPSS macro (model 15), which estimates the conditional direct and conditional indirect effects of the moderated mediation model. To control for the potential impact of visual attention to exemplars as well as the variably exciting/dull nature of exemplars, both variables were included as covariates in the model. Paths for the full process model, along with their corresponding coefficients, are shown in Figure 3. The conditional direct effect ( $c'$ ) of subjective interest on base-rate recall, removing the effect of the mediator (i.e., selective exposure), was not significant at any level of one's objective sports knowledge, and thus, the effect of subjective interest on recall was fully mediated through selective exposure. However, the conditional indirect effect of subjective interest in sports on recall of base-rate measures of athletic performance through selective exposure to base-rate data within the stimuli was significant for those at moderate ( $B = .051$ ,  $SE = .02$ , 95% BCI [.0115, .1038]) and high levels ( $B = .066$ ,  $SE = .03$ , 95% BCI [.0160, .1333]) of objective sports knowledge; this



**Figure 3.** Full moderated mediation model with path coefficients. \*  $p < .05$

conditional indirect effect was not significant for those at low levels of knowledge. In other words, analysis revealed an indirect positive association between subjective interest and base-rate recall through selective exposure to base-rate indicators of athletic performance, but only for those at moderate and high levels of objective sports knowledge. This suggests that exemplification effects in terms of recall of objective base-rate data is dependent upon one's knowledge of the subject matter.

## Discussion

One assertion regarding the dominant effects of exemplars in communication is that media consumers allocate less attention to more pallid presentations of base-rate information during message consumption (Brosius & Bathelt, 1994). Thus, we proposed that selective exposure provides an ideal lens for examining visual attention to competing information types (i.e., exemplars versus base-rate quantification) and how that attention crafts viewer response. Although study participants indeed did pay considerably greater attention to exemplars, the effect of this selective exposure on recall of information presented in the stimuli was dependent upon one's topical knowledge. Thus, the findings demonstrate the value of directly assessing visual attention alongside other measures to illuminate how selective exposure to message elements shapes message effects.

### *Selective Exposure to Exemplars versus Base-Rate Data*

One of the first benefits of the present study was to shed additional light on how viewers allocate attention to competing types of information when presented concurrently and empirically assess whether media consumers indeed ignore base-rate information (Koehler, 1996). First, in line with predictions derived from exemplification theory (Brosius & Bathelt, 1994) as well as information processing models (Lang, 2000), exemplars attracted considerably greater visual attention than the relatively pallid, static presentation of base-rate data. This difference held even when adjusting for the proportion of the screen occupied by this content element. Furthermore, this pattern was consistent regardless of the exciting or dull nature of the exemplars (i.e., highly successful versus only modestly successful performance). As such, these findings resonate with the assertion media consumers allocate greater attention to exemplars (Brosius & Bathelt, 1994; Zillmann, 1999). Although the failure to find differences in attention as a function of the variably exciting/dull nature of the exemplars somewhat contradicts research suggesting that the emotional potency of exemplars impacts selective exposure (Knobloch et al., 2003b), differences in study content and design could certainly account for such discrepancies. For example, past

research has tested effects in the context of threatening events (e.g., flu), not sports. Second, the emotional potency of stimuli undoubtedly varies across studies or contexts to account for such discrepancies. Indeed, as previously noted, to preserve the ecological validity of the stimuli, exemplars used here reflected either outstanding play or more mundane competition. Although they systematically varied in rated excitement level, even the relatively “dull” exemplars employed in this study may be sufficiently emotionally charged to elicit increased attention.

Although exemplars drew greater attention overall, selective exposure to base-rate data was evident. Subjective interest in sports was associated with significantly greater time spent scrutinizing this type of information. Thus, this study joins a growing body of literature that demonstrates eye tracking as a precise measure of selective exposure (Kessler & Zillich, 2019; Marquart et al., 2016; Sülflow et al., 2019). Furthermore, it somewhat dispels the assertion that media consumers “ignore” base-rate evidence, as has been loosely suggested (Koehler, 1996).

Perhaps of greater importance is the pattern of findings demonstrated through the model tested here, as selective exposure to base-rate information alone did not account for the subsequent memory effects. First, these findings demonstrate the benefit of directly assessing message consumption to reveal the increased scrutiny of base-rate information as a function of individual characteristics that was assumed or suggested in past exemplification research (e.g., Callison et al., 2009; Zillmann et al., 2009). Second, mere scrutiny of the information via selective exposure did not explain the improved recall demonstrated here. Instead, the effect of domain-specific interest on one’s recall of base-rate data is wholly mediated through visual attention. Second, the impact of this selective exposure was then moderated by topical knowledge. Among those with low levels of knowledge on the subject matter, this indirect effect of attention on recall was not found. Thus, selective exposure worked in concert with one’s existing knowledge to yield differences in memory for the message. Similar limiting conditions may well translate to other settings or contexts, such as health communication (Spence et al., 2017; Zillmann, 2006), news (Oschatz et al., 2019), or other social issues, and selective exposure alone may not be sufficient to achieve strategic message goals. Although the focus of the present study was recall of base-rate information, future research could explore similar effects on subjective perceptions such as risk assessment or prevalence of a phenomenon to more closely scrutinize how selective exposure to competing information types impacts these varied outcomes of message consumption.

In addition to these broader theoretical contributions, the present findings also advance the more focused area of sport communication. One vein of inquiry has sought to better understand the heterogeneous nature of sport consumers, and the present study helps demonstrate that not all viewers

watch sports content in a similar fashion. For example, Earnhardt and Haridakis (2008) offered a distinction between highly invested fans versus mere spectators. Other scholarship has yielded numerous motivations and behaviors that typify differences among audiences, such as distinct pre- and post-viewing surveillance/information-seeking needs (Gantz et al., 2006; Tang & Cooper, 2018). The finding that viewers with greater interest in sports allocated greater attention to base-rate quantifications resonates with research examining attention to on-screen graphics containing this type of information (Cummins et al., 2016). Furthermore, the model tested here demonstrated that while subjective interest in sports impacts attention allocation, actual knowledge moderates how well information is committed to memory for later recall. Thus, subjective interest and objective knowledge are distinct phenomena (D.A. Hahn & Cummins, 2018). As such, the present findings suggest that future research examining sport fanship should consider employing additional, more precise measures to help examine the nuanced relationships among these variables.

### ***Limitations & Directions for Future Research***

Although these findings illuminate the relationship between user characteristics, behavior (in the form of selective exposure), and message effects, the study does present limitations that may be addressed through continued research. First and foremost, the context of this study is limited to sport communication. As previously noted, a useful next step would be examining these processes in the context of other topics. For example, much research into exemplification effects has focused on health and risk (Spence et al., 2017; Zillmann, 2006). Exemplification research exploring the effects of competing forms of information may adopt the approach reflected here to examine influences on message consumption. Second, the present study explicitly drew upon past work that focused on improved memory for base-rate information as a function of individual characteristics (Callison et al., 2009; Zillmann et al., 2009). Future work could explore other effects, such as subjective risk perceptions, that may stem from selective exposure to competing information types. In doing so, research could similarly employ precise measures of message consumption to illuminate how selective exposure to exemplar versus base-rate information impacts phenomena such as risk perception, perceived public opinion, and more.

Finally, the present study examined selective exposure to information types in a single interface, where static base-rate data was presented alongside exemplars. Media producers employ a variety of techniques (e.g., animations, sound effects, edits, physical arrangement) to elicit or guide attention to specific message elements. As such, production features could encourage selective exposure to base-rate data that could override or interact with

individual characteristics to guide visual attention allocation and depth of information processing (e.g., Merle et al., 2014; de Koning et al., 2007; Fox et al., 2004; Lang et al., 2002; Potter, 2006). This presents a rich opportunity to employ precise measures of visual attention as demonstrated here in order to document the specific message elements selected for greater processing. Despite these limitations, this study both advances exemplification research by demonstrating the role of selective exposure and also provides a model for future research that demonstrates the utility of directly assessing visual attention. Contemporary media consumption settings present audiences with a rich sensory environment, where they must selectively attend to competing information streams (e.g., Brechman et al., 2015), and merely assessing global measures of message exposure fails to capture the richness of how consumers watch media. As demonstrated here, viewer agency in selectively allocating attention has rich potential for impacting viewing outcomes of all kinds.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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