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The Influence of Focal Length and Aperture on the Perception of Business Portraits

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Abstract: Business portrait photographs are often perceived as neutral representations of professionals, although their impression is shaped by a series of technical decisions made during shooting. This paper examines how combinations of lens focal length and aperture, i.e. depth of field, influence the selection of business portraits regarding different communication effects. Six models, three male and three female, were photographed under controlled studio conditions using nine parameter combinations: 28 mm, 85 mm and 180 mm, and f/2.8, f/5.6 and f/11. For each model, respondents viewed a composite image made of nine photographs of the same person and selected the photograph that best matched the given impression. The analysis included selection frequencies, post-hoc comparisons and a robustness check using a logistic model. The results indicate that individual parameter combinations are systematically associated with different evaluations of the business portrait, opening space for empirically grounded shooting guidelines.

Keywords: aperture; business portrait photograph; depth of field; face perception; focal length

1 INTRODUCTION

Business portraits are a specific form of photography at the intersection of art and a clearly expressed function. In this paper, the term *business portrait photograph* refers to a photographic portrait intended for the professional identification and representation of a person in business and organisational contexts, such as organisational websites, professional networks, job-search platforms, annual reports and similar communication channels. Unlike general portrait photography, documentary portraiture, actor headshots or informal profile photographs, the business portrait is not primarily narrative, expressive or promotional in a personal sense, but is expected to communicate professional presence, credibility and suitability within a specific institutional or business environment. In professional literature, business portrait photographs become more clearly distinguished in the early 2000s, when they begin to be defined as a subvariant of the general photographic portrait, with their own principles and requirements [1]. While they follow the basic rules of portrait photography, what separates them from the classical, beautiful or documentary portrait is their pronounced utility.

Although often viewed as a neutral representation of employees or experts in a certain profession, business portraits are never completely neutral. They participate in shaping first impressions of the portrayed person, and these impressions can also be transferred to the organisation that person represents. Business portrait photography therefore does not record only the appearance of the individual, but communicates a range of qualities such as trust, approachability, competence and professional credibility. Literature on employer image and employer branding shows that the visual presentation of people within an organisation can shape the perceived attractiveness of the employer and influence behavioural intentions, for example the decision to apply for a job [2, 3].

Social-cognitive research helps explain why photographs of faces function as such powerful signals. Observers form first impressions of faces after an extremely short time, sometimes after as little as 100 ms [4]. These impressions are mostly based on a small number of socially significant dimensions. One influential framework emphasises warmth and competence as two central dimensions of social cognition [5], while another framework describes face evaluation through valence, or trustworthiness, and dominance [6]. What they share is that we do not observe a face only as a visual object, but very quickly draw conclusions from it about a person's intentions, abilities and social position.

It is precisely here that the photographic medium stops being only a transmitter. Contemporary reviews of social attributions from faces show that judgements of trustworthiness, competence and related traits are sensitive to visual cues, including those produced through photographic mediation [7]. A portrait that appears natural, clear and harmonious can therefore be understood as evidence of the personal qualities of the portrayed person, even though such an effect is at least partly produced by the photographer's technical choices.

Among these choices, lens focal length and aperture, i.e. depth of field, stand out in particular. Focal length, together with the distance between camera and subject, systematically changes the geometry of the facial depiction and the perception of its proportions [8, 9]. The effect of selfie photography, in which the face is photographed from a very short distance and with wide-angle optics, shows that such conditions can emphasise central facial features and disturb the perception of proportions [10]. Depth of field introduces a different type of change: it does not change the geometry of the face, but the relationship between the face and its surroundings. By controlling the distribution of sharpness and blur, depth of field changes how much of the surrounding context remains visible, how strongly the subject stands out from the background, and how easily attention is directed towards the face [11–13].

Despite the relevant findings, there remains a gap between what is routinely adjusted in photographic practice and what has been empirically verified specifically in the business portrait. Previous studies mainly address general face perception, distortion when taking selfies, attractiveness, or isolated technical variables, while the

business portrait is often assumed as a practical format rather than treated as a separate research object. This study therefore examines how different combinations of focal length and aperture are associated with the selection of business portraits with regard to impressions such as warmth, competence, trustworthiness, dominance, business suitability and the naturalness of facial proportions.

2 MATERIAL AND METHODS

2.1 Photographic Material

The research was conducted on a set of business portrait photographs taken under controlled studio conditions, using a full-frame camera (Nikon Z7II), and Nikkor Z 28 mm f/2.8 and Nikkor Z 70–180 mm f/2.8 lenses. Six models were photographed, three male and three female. Each model was photographed in nine parameter combinations, obtained by combining three lens focal lengths and three apertures. The focal lengths used were 28 mm, 85 mm and 180 mm, while the apertures were f/2.8, f/5.6 and f/11. The selected focal lengths and aperture values were chosen to cover a controlled range of conditions relevant to portrait practice on a full-frame camera. The 28 mm focal length represented a wide-angle condition, in which the camera was positioned close to the portrayed person and perspective distortion was expected to be more visible. The 85 mm focal length represented a commonly used portrait setting, while 180 mm represented a longer telephoto condition, associated with greater camera-to-subject distance and reduced perspective distortion. The aperture values were selected to represent a shallow depth of field (f/2.8), a moderate depth of field (f/5.6) and a deeper depth of field with greater overall sharpness (f/11). This range made it possible to examine both changes in facial geometry related to focal length and camera distance, and changes in the distribution of sharpness and blur related to aperture.

The models were photographed from eye level, at distances of 60 cm (for the 28 mm focal length), 190 cm (for the 85 mm focal length) and 400 cm (for the 180 mm focal length).The other shooting conditions were kept constant: neutral grey background, studio lighting, similar framing, gaze directed towards the camera and a mild, unobtrusive expression. In this way, the influence of factors that are not the subject of this paper was reduced, while variations resulting from changes in focal length and depth of field were retained.

For each model, a composite image with nine photographs of the same person was created (as shown in Fig. 1). The position of the photographs within the image was random, so that the position did not follow the order of photographic parameters. Each position was marked with a number from 1 to 9, while a separate coding table recorded which position corresponded to which parameter combination.



Figure 1 Example of composite image

2.2 Respondents and Procedure

The survey was conducted online, using Google Forms. Students participated in the study, because they can be viewed as a group close to early-career job seekers. A total of 119 responses were collected. After applying the basic inclusion and exclusion criteria, 113 respondents entered the analytical dataset. Respondents older than 35, those who did

not pass the attention check or those whose responses were not sufficiently complete were excluded from the analysis. If a respondent stated that they knew a particular portrayed model, not all their responses were excluded from the analysis, but only those related to that model (Tab. 1).

For each model, respondents viewed all nine photographs simultaneously and, for each statement, selected one photograph that in their impression best matched the description. The order of photographs within each composite image was randomised and marked with numbers from 1 to 9. For selected constructs, negatively formulated statements were also included, in which respondents were asked to select the photograph that least matched the description. The same photograph could be selected for several statements.

Table 1 Sample structure and data cleaning

Element	Value
Total number of responses	119
Number of valid respondents	113
Number of portrayed models	6
Number of photographs per model	9
Total number of analysed model evaluations	666
Total number of individual selections	6660

A forced-choice procedure was used because the aim of the study was not to measure absolute ratings of individual photographs, but to identify relative preferences among technically different versions of the same business portrait. By presenting nine photographs of the same person simultaneously, the influence of differences between portrayed individuals was reduced, while respondents were directed to compare subtle variations resulting from focal length and aperture. This approach made it possible to examine which parameter combinations were more often associated with a particular impression within the same portrayed model.

The statements referred to the following impressions: the most positive general impression, warmth and approachability, competence and expertise, trustworthiness, dominance and authority, suitability as a business portrait photograph, and naturalness and proportionality of the face. Negatively formulated statements referred to the lowest suitability, the lowest naturalness and proportionality of the face, and the lowest trustworthiness.

2.3 Data Analysis

The responses from the Google Forms table were translated, using a coding table, into an analytical format: respondent – model – statement – selected position – focal length – aperture. Only valid responses were included in the analysis; when a respondent reported knowing a particular portrayed model, only that respondent's answers for that model were excluded. For each statement, frequencies and percentages of selecting individual focal lengths, apertures and parameter combinations were calculated. This made it possible to compare both isolated parameter levels and their specific combinations. The distributions of selections were tested using chi-square tests, and standardised residuals were used to determine which combinations deviated the most from the expected distribution.

For statements with a positive and a negative pole, a net indicator was also calculated, as the difference between the number of selections of the positive and the negative statement. In addition, a robustness check was conducted using a logistic choice model with clustering by respondent and with the effect of the portrayed model included. In this model, each parameter combination was treated as either selected or not selected for a given statement. This analysis was used to examine whether the patterns found in the frequency-based results remained stable when repeated responses from the same respondent and differences between portrayed models were taken into account. The results of the robustness check are presented as odds ratios (OR) and p-values corrected using the Benjamini–Hochberg procedure.

3 RESULTS

The results show that selections of photographs are not distributed randomly across parameter combinations, but that individual combinations are systematically associated with certain impressions. Since respondents selected one photograph from a set of nine photographs of the same person, the results are interpreted as relative preferences within each model, rather than as absolute ratings of individual photographs. The clearest pattern is visible in the distinction between a warm and positive impression on the one hand, and business suitability, competence and trustworthiness on the other. The most frequently selected parameter combinations for each statement, together with the corresponding percentages and robustness-check results, are shown in Tab. 2. The percentages represent the share of selections within each individual statement, while the robustness-check column shows whether the same parameter combination remained statistically relevant in the logistic model.

Table 2 Most frequently selected parameter combinations by statement

Statement	Most frequent combination	Share of selections	Robustness check
Most positive general impression	85 mm / f/2.8	23,1%	OR = 1,40; pBH = 0,016
Warmest and most approachable	85 mm / f/2.8	27,9%	OR = 2,12; pBH < 0,001
Most competent and expert	180 mm / f/5.6	32,1%	OR = 2,09; pBH < 0,001
Most trustworthy	180 mm / f/5.6	28,4%	OR = 1,79; pBH < 0,001
Most dominant / authoritative	180 mm / f/5.6	30,6%	OR = 1,67; pBH < 0,001
Most suitable as a business portrait	180 mm / f/5.6	32,0%	OR = 2,14; pBH < 0,001
Most natural / proportional face	180 mm / f/5.6	21,6%	not clearly separated
Least suitable	28 mm / f/2.8	36,9%	OR = 1,49; pBH = 0,007
Least natural / proportional face	28 mm / f/2.8	38,3%	OR = 1,68; pBH < 0,001
Least trustworthy	28 mm / f/2.8	28,1%	not clearly separated

The combination 85 mm / f/2.8 was most frequently selected for the most positive general impression (23,1%) and for warmth and approachability (27,9%). The medium focal length combined with a shallower depth of field therefore appears as the setting that most strongly supports an impression of pleasantness, closeness and approachability.

The combination 180 mm / f/5.6 was most frequently selected for competence and expertise (32,1%), trustworthiness (28,4%), dominance and authority (30,6%) and suitability as a business portrait photograph (32,0%). The same combination was also most frequently selected for naturalness and proportionality of the face (21,6%), although in that statement it was not statistically clearly separated from the second most frequent combination (180 mm / f/2.8 – 18,9%).

The opposite pattern is visible in negatively formulated statements. The combination 28 mm / f/2.8 was most frequently selected as the least suitable for a business portrait photograph (36,9%) and as the combination in which the face appears least natural and proportional (38,3%). The same combination was also most frequently selected as the least trustworthy (28,1%), but for this statement it was not statistically clearly separated from the combination 28 mm / f/5.6.

The net indicators for pairs of statements further support the difference between settings associated with desirable and undesirable impressions. For suitability as a business portrait and naturalness/proportionality of the face, combinations with 180 mm show a positive net effect, while combinations with 28 mm, especially 28 mm / f/2.8, show a strongly negative net effect. For trustworthiness, the pattern is similar but somewhat less pronounced, which suggests that trustworthiness is probably shaped by a combination of several visual factors, rather than by facial geometry alone.

The distribution of selections across all statements and parameter combinations is shown in Tab. 3. The heatmap values represent the percentage of selections for each parameter combination within a given statement; therefore, each row shows how selections for one statement were distributed across the nine focal length and aperture combinations. Darker cells indicate combinations that were selected more frequently within that statement, making visible the clustering of positive, professional and negative impressions around different photographic settings.

Table 3 Heatmap: statements × parameter combinations

Statement	28 mm / f/2.8%	28 mm / f/5.6%	28 mm / f/11%	85 mm / f/2.8%	85 mm / f/5.6%	85 mm / f/11%	180 mm / f/2.8%	180 mm / f/5.6%	180 mm / f/11%
Most positive general impression	3,30	1,80	6,61	23,12	11,86	11,41	17,72	13,06	11,11
Warmest and most approachable	3,60	5,26	11,26	27,93	10,36	9,91	15,47	6,31	9,91
Most competent and expert	1,20	1,20	1,65	8,56	12,46	6,76	17,57	32,13	18,47
Most trustworthy	1,65	1,65	1,95	9,91	12,01	8,86	17,42	28,38	18,17
Most dominant / authoritative	1,35	1,50	2,40	5,41	10,81	6,91	20,12	30,63	20,87
Most suitable as a business portrait	2,10	1,65	0,90	9,16	10,36	8,41	17,42	31,98	18,02
Most natural / proportional face	4,05	2,85	1,20	12,61	12,91	9,46	18,92	21,62	16,37
Least suitable as a business portrait	36,94	28,23	22,22	2,70	1,95	1,65	2,25	2,10	1,95
Least natural / proportional face	38,29	27,03	21,32	2,55	2,10	1,95	3,15	1,35	2,25
Least trustworthy	28,08	24,47	23,12	4,50	2,70	4,20	5,11	3,15	4,65

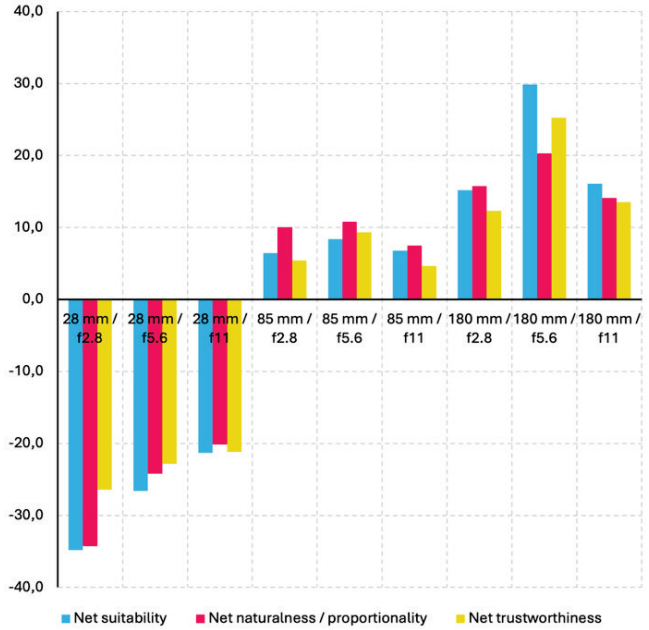


Figure 2 Net selection index by focal length and aperture combination

Fig. 2 shows the net selection index calculated from corresponding positive and negative versions of the same statements. The index was calculated by subtracting the percentage of selections for the negative statement from the percentage of selections for the corresponding positive statement for each parameter combination. Positive values therefore indicate that a combination was selected more often in a favourable context, while negative values indicate that it was selected more often in an unfavourable context. This makes it possible to distinguish combinations that are simply often selected from those that are more clearly polarised towards a desirable or undesirable interpretation.

For suitability as a business portrait and naturalness / proportionality of the face, combinations with 180 mm have a positive net effect, while combinations with 28 mm, especially 28 mm / f/2.8, have a markedly negative net effect. For trustworthiness, the pattern is similar but somewhat less pronounced, which suggests that trustworthiness is probably shaped by a combination of several visual factors, and not only by facial geometry.

4 DISCUSSION

The results of the study indicate that the perception of a business portrait is not determined only by an individual technical parameter, but by the combination of focal length and aperture. In photographic practice, these parameters are most often treated as basic tools of portrait shaping [1], while existing research mainly considers the effects of focal length, perspective distortion or blur separately [8, 10, 13]. This study shows that different combinations of the same parameters can produce different communication effects: one setting may appear warmer and more approachable, while another may be more clearly associated with competence, trustworthiness and business suitability.

The medium focal length of 85 mm in combination with f/2.8 was most often associated with a positive general impression and warmth / approachability. Such a result is understandable because 85 mm preserves relatively natural facial proportions, while the shallower depth of field reduces the amount of visual information and directs attention towards the focus area. In a business context, this combination can be suitable when the aim is to achieve an impression of approachability, pleasantness and closeness.

On the other hand, the combination 180 mm / f/5.6 was most often associated with competence, trustworthiness, dominance and the general suitability of the business portrait. A longer focal length reduces perspective distortion and provides a more stable depiction of facial proportions, while the medium aperture maintains sufficient sharpness and control of the image without excessive blur. In this way, the photograph can appear more professional, formal and secure, but not necessarily the warmest.

The clearest negative evaluations are associated with 28 mm / f/2.8. This is consistent with previous research on the influence of wide-angle shooting and short camera-to-subject distance on the perception of facial proportions [8-10]. In business portraiture, such a combination may be risky because viewers do not necessarily read distortion or unnaturalness of the image as a technical effect, but as an unfavourable impression of the person. The results therefore clearly show that technical parameters do not remain only technical, but participate in the formation of social attributions.

The findings also indicate that there is no single universally best setting for a business portrait. If the communication goal is warmth and approachability, a medium focal length with a shallow depth of field may be a more appropriate choice. If the goal is to emphasise professionalism, competence and trustworthiness, a longer focal length with a moderate aperture shows a more stable pattern. This distinction is important for the practical production of business portraits because it allows shooting decisions to be based not only on the intuition or aesthetic preference of the photographer, but also on the expected communication effect.

For professional photographers, the results suggest that focal length and aperture should be considered as part of the communicative strategy of the portrait, not only as technical or stylistic choices. In practice, this means that the same person may need to be photographed differently depending on whether the intended impression is approachability, authority, reliability or professional neutrality. Such an approach can support a more deliberate dialogue between photographer and client before the shooting process, especially when the portrait is intended for organisational websites, professional profiles or public communication materials.

The findings are also relevant for employer branding and organisational communication. Business portraits often appear as part of a wider visual identity, where they contribute to the way employees, teams and organisations are perceived. If all portraits within an organisation follow the same visual standard, they may support consistency; however, the desired impression may still differ depending on the role, context or audience. For example, portraits of team leaders, consultants, lecturers or customer-facing employees may require different balances of approachability, competence and authority. The results therefore suggest that business portrait guidelines should not define only formal consistency, but also the intended communication effect of the image.

The forced-choice format used in this study was useful because it allowed respondents to compare subtle technical variants of the same portrait directly. Presenting all nine versions of the same person at the same time reduced the influence of differences between portrayed individuals and directed attention towards the effects of focal length and aperture. At the same time, this approach necessarily limits the interpretation of the results. The study does not measure how warm, competent or trustworthy each photograph is in an absolute sense, but shows which technical variant is more often associated with a particular impression in comparison with other versions of the same portrait. It also does not allow the intensity of perceived differences to be measured.

Another limitation concerns the controlled studio setting. The neutral grey background was used deliberately in order to reduce the influence of contextual and visual variables that were not the focus of the study. However, such a background may also have reduced the visible effect of depth of field. Since the background contained little visual detail, differences in blur and background separation were less pronounced than they might be in a more complex environment, such as an office interior, outdoor setting or branded organisational space. This may help explain why aperture did not emerge as the strongest or most consistent factor for all impressions, and why the effects of focal length and facial geometry appear more clearly in some results. The findings related to aperture should therefore be interpreted within the specific conditions of a controlled, visually neutral studio portrait.

A further limitation concerns the sample, which consisted of students. Although this is a relevant group in the context of early career self-presentation and job seeking, the results should be further tested on samples of HR professionals, photographers and a broader professional population. Future research should also examine whether the role of aperture becomes more pronounced when portraits are taken in visually richer environments, where depth of field can more strongly influence the separation of the portrayed person from the background.

Despite these limitations, the study shows that even a relatively simple experimental design can provide useful

guidelines for practice. Systematic variation of focal length and aperture allows a clearer understanding of how technical decisions in portrait photography are translated into perceptual and communication effects. The results therefore show that shooting parameters do not only affect the visual appearance of a photograph, but also indirectly shape the way in which viewers perceive the portrayed person through changes in facial geometry and the distribution of depth of field.

5 CONCLUSION

The study shows that combinations of focal length and aperture have a measurable influence on the choice of business photographic portraits in relation to different impressions. The combination 85 mm / f/2.8 was most often associated with a positive and approachable impression, while the combination 180 mm / f/5.6 was most often associated with competence, trustworthiness, dominance and suitability as a business portrait. In contrast, 28 mm / f/2.8 was most often associated with the least desirable evaluations, particularly with unsuitability and unnatural facial proportions.

The results indicate that a business portrait can be understood as a technically produced communication object, and not only as a neutral representation of a person. The choice of shooting parameters should therefore be connected with the communication goal: different settings may be suitable for an impression of approachability, while others may be more suitable for an impression of professional stability and competence. In this way, the study provides practical guidelines for the selection of technical parameters in the production of business photographic portraits.

Future research should examine whether the same patterns remain stable in other respondent groups, especially among HR specialists, photographers, designers, employers and professionals involved in organisational communication. Such groups could provide insight into whether the impressions found in the student sample are also relevant in contexts in which business portraits are professionally produced, selected or evaluated. It would also be useful to test whether similar effects occur in less controlled environments, such as workplace interiors or branded organisational settings. Such extensions would make it possible to connect controlled photographic parameters more directly with everyday professional portrait practice, employer branding and real-world decisions about visual professional representation.

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