Why the Devil Wears Prada :
The Fashion Formation Process in a
Simultaneous Disclosure Game
Between Designers and Media

by
Evelyn Gick* and Wolfgang Gick**

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Why The Devil Wears Prada

The Fashion Formation Process in a Simultaneous Disclosure Game Between Designers and Media

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Abstract

Changes in the world of fashion from haute couture to pret-a-porter, the introduction of the mass market as well as the democratization of fashion call for a new explanation of the fashion formation process. We offer a three-player cheap talk disclosure mechanism to explain why, after observing the collection of designers, the fashion media sometimes proclaim a new fashion, and why they often do not. This mechanism is more informative than one in which only one designer is consulted. Our paper extends the literature on fashion economics; our findings are in line with those of fashion experts.

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1 Fashion[1]

Fashion reflects the spirit of the age (*zeitgeist*).[2] As such, it inescapably influences all areas of our life. Home decoration, clothing, music, architecture, cars, and political debate are subject to what people perceive as being the expression of the *zeitgeist*. Social happenings, discoveries, and inventions mold this 'spirit'. However, the intensity with which it affects the design of goods that surround us differs widely among the creative industries.[3] Fashion does not "flourish as unabashedly in cookware, gardening, and building design"[4] as it does in clothing.

Women's clothing catches the most volatile expressions of the *zeitgeist*. In the fall of 2001, fashion designers reacted to the display of terrorism in the mass media by presenting collections with a militant touch.[5] In the spring of 2007, some fashion houses set the *zeitgeist* topic global warming on the fashion agenda, expressing this through the use of energy-efficient materials such as polyester.[6] Although few of us decide to wear clothes like those displayed in *haute couture* shows, none of us can escape fashion. It is too powerful a social phenomenon to ignore, and obliviousness in regard to fashion can itselfbecome a fashion statement. Even when one wears something that is not noticeably fashionable, we can still learn something about the wearer's position vis-a-vis notions of fashion or style.

Whether we like it or not, our society forces us constantly to have an opinion about changing social topics. We all are exposed to the prevalent public discourse that forms and changes the political thought of the times. In a more subtle way, we all play our role in the daily vanity fair. In postmodern societies we use our clothes as an expression of our personal opinion of the *zeitgeist;* clothes function as an "open text"[7]. Their meaning is value- and preference dependent, and dress expresses a wearer's ideological position. We constantly seek information as to how this *zeitgeist* is expressed in fashion, through consulting the "elaborate institutional apparatus surrounding the propagation of fashion in the domain of dress,"[8] in particular the fashion media.

It is helpful to divide today's fashion process into two distinct parts, the "visual narrative of fashion media"[9] that influences our style and eventually our demand for fashion as a commodity, and the production of a fashionable garment and its accessories as market goods.

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[2]Blumer (1969), Svendsen (2006).

[3]Caves (2000) has argued that creative industries use specific organizational forms to reduce the uncertainty that producers face when deciding on new product lines when sunk costs are essential determinants of firm behavior. Our paper is compatible with Caves' (p. 183) view, although we focus on a different process of disclosure, while he analyzes the industrial organization of creative industries.

[4]Davis (1992 p.120).

[5]"There was a real sense that the women on the runways were going into battle." (Anne Wintour, 2006).

[6]"Can Polyester save the World?" *New York Times*, January 25, 2007.

[7]Crane (2000 p. 243) argues that even garments acquire different meanings in different subgroups at different times, while in class societies of earlier centuries this meaning was unalterable.

[8]Davis (1992 p. 120).

[9]Leon (2005).

Our model studies the first. It is the very role of fashion media to make the *zeitgeist* in fashion accessible to us, extrapolating it from runway exhibitions involving a number of designers.

Our paper aims at closing an important lacuna in the literature of fashion economics. Vogue can either proclaim a new fashion as the new 'style' or deny this result to the designers. We understand what Vogue articulates as the commonly accepted *zeitgeist* in fashion, at least as long as we feel it expresses our view about what fashion should be. This explanation of fashion formation was initially laid out in Blumer's (1969) selection model of fashion and later extended by Davis (1992) but so far has not become part of economic analysis. The bulk of economic contributions on fashion still follow Simmel's (1904) and Veblen's (1899) findings, commonly known as the "trickle-down" theory of fashion.

This theory in particular does not take into account the fact that fashion is no longer determined by what an upper class wears. There has been a shift from 'class' to 'consumer' fashion since the late 1950s, establishing the mass market with *pret-a-porter* (ready to wear, off-the-rack clothing). *Haute couture*[10] may still survive in niches, with its fashion mediators, starlets, and the exclusive clientele to which it caters. "*Haute couture* has escaped from fashion," as Christian Lacroix puts it.[11] It is *this* change that has enabled the democratization of fashion that we observe, and it is also the main reason for the extreme volatility of fashion in the domain of dress. As Sinnreich and Gluck (2005 p. 20/21) observe,

> By the 1960s, haute couture's stranglehold on fashion was beginning to weaken. Hollywood films, television, rock music, youth culture, the women's movement, revolutionary politics all served to destabilize the top-down fashion paradigm, with trends generated by consumers (particularly the younger ones) rather than the large couture houses. The further democratization of fashion during this time could be seen in the establishment of numerous casual wear companies [...]. Such changes in the fashion industry were precipitated by the underlying cultural, political and social shifts following World War II.

Fashion has become more democratic, but not egalitarian, as Svendsen (2006) argues, with income and assets becoming less important means toward achieving social distinction. The advent of postmodernism with its "individualist assertion of personal autonomy"[12] has changed our concept of social distinction. We distinguish ourselves by expressing our ideological position to others, and this defines the group to which we belong.[13]

The remainder of our paper is organized as follows: section two gives an overview of the literature in fashion economics and sets the stage for the game-theoretic model that

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[10]Note that this term implies dresses made to order and being hand-sewn, and the Paris fashion shows contain haute couture creations because this is a prerequisite for becoming a coutoure house and member of the chambre syndicale. Nevertheless, the vast majority of clothes shown during fashion events belongs to the field of pret-a-porter. For about a decade, many fashion houses have decided not to offer haute couture shows anymore since it is too costly for them to engage in the disclosure of pure artwork.

[11]Christian Lacroix in a television interview, 1998, quoted in Crane (2000 p. 132).

[12]Lipovetsky (1994 p. 149).

[13]As Crane (2000 p. 29) puts it, "[v]arious forms of fashionable clothing are worn by some members of all social classes, but the characteristics of social classes have changed [...]."

we present in Section 3. This section starts with an overview of the underlying theory of strategic information transmission in cheap talk games that can be skipped by the reader steeped in the literature. The remainder of section 3 explains the model. In section 4 we discuss our findings and present a conclusion.

2   Fashion and Economics

Economists have had notorious difficulties pinning down a term as volatile as fashion. The utilitarian Carlyle has argued that "little or nothing of a fundamental character [...] has been written on the subject of clothes." And even today, for many economists fashion remains the outcome of an "opaque process,"[14] not well suited to economic analysis. By and large, the economics of fashion is a theory of demand, as a function of price and income, with stable preferences toward the good consumed. Compared to the large strand of elaborate fashion theories in the field of fashion marketing and social sciences, economic theory still has done little to investigate those processes more rigorously, to explain what leads to the establishment of a new fashion, and to analyze why we all understand and perceive that a new fashion is new.

Virtually all economic theories so far have incorporated the essence of one particular sociological paper, written more than a century ago: Georg Simmel's (1904) upper-class theory of fashion. For generations, economic theorists have aimed at distilling useful and general results out of Simmel's many contradictory observations, such as his idea of individual consumer behavior being generally dualistic in nature. Simmel's well known idea that "[t]wo social tendencies are essential to the establishment of fashion, namely the need of union on the one hand, and the need of isolation on the other,"[15] has found its way into economic analysis.

Leibenstein (1950 p. 133) has identified the desire to be "in style" and the effort to "attain exclusiveness" as the driving forces in fashion. Primarily interested in welfare analysis, he has coined aggregate consumption phenomena into a 'nonfunctional demand' comprising "bandwagon effects" that follow a desire to "join the crowd," and "snob" effects, related to the search for exclusiveness. Robinson (1961 p. 385) has characterized fashion goods by their "extreme inelasticity of product demand," which itself follows a fashion consumer's primary "pursuit of demonstrable rarity." In his view, it is the "substance" and "demonstrability" of a fashion good that accounts for its typical inelasticity. Consequently Robinson's fashion consumer is "actively rarity-minded," a trait that permits Robinson to question some properties of the commonly accepted trickle-down theory, according to which a new fashion is first consumed by the upper class, then seen and worn by the next highest income group, finding its way finally to the lower strata. All of this characterizes the properties of a fashion cycle.

A new explanation of fashion demand can be found in Stigler and Becker (1977) who claim that tastes are stable over time and, as long as they are shared among consumers, do not need to be part of a theory of demand. Instead of deriving utility directly from market

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[14]Pesendorfer (1995).
[15]Simmel (1904[1957] p. 546).

goods, consumers procude a *commodity* out of the market good through the use of time, skills and human capital. When listening to music, the demand for the corresponding commodity 'music appreciation' increases, but this does not correspond to a change in taste. Instead, being exposed to music increases the subsequent demand for it; the household increases its marginal utility of time spent listening to music through the investment in its stock of 'music capital'.

Although this concept can be used to explain addiction, it is quite difficult to extend it to fashion.[16] Karni and Schmeidler (1990) have instead shown that fixed preferences for a good may nevertheless account for cyclical variations of taste attributes, such as color. If two classes of consumers, a and b, have the choice between two colors, and the preference of a consumer in a for a given color decreases as the preference of those in b for the same color increases, but not vice versa, a fashion cycle will emerge, with the preference for the good itself remaining unchanged. Matsuyama (1992) has shown how cyclical variations in demand occur when conformists and nonconformists are matched in pairs. The frequency with which one type meets its opponent type is constant but different in each direction, and the matching game yields type-dependent payoffs, leading to equilibria with cyclical variations in demand.

Corneo and Jeanne (1999) have replaced the assumption of class-specific preferences with the effect of socialization and communication on a player's consumption skills. Although their paper does not focus on dress fashion, Corneo and Jeanne show how segmented communication channels lead to the consumption of fashionable goods, with type-A individuals (locals that create a positive externality) being matched with type-B players (tourists with negative externalities). Strongly segmented socialization leads to behavior perceived as fashionable, following a word-of-mouth process of information transmission.

It is doubtlessly Pesendorfer's (1995) work on social signaling and the accelerated need for a new fashion 'cycle' that has attracted most attention in economics because it permits us to explain fashion behavior incorporating both the demand and supply side. A designer-monopolist sells a new fashion good (dress, design innovation) worn by consumers to signal quality (high vs. low). Consumers are matched in pairs in a dating game, with an initially high uncertainty about types as long as the fashion is new. However each individual prefers to be matched with a high-type player. Through the purchase of a particular new dress, each consumer is able to signal quality. This is observed by other players who now receive a clearer picture about their own type, since wearing the new dress renders it more likely to meet high types. Pesendorfer's demand for a fashion good is novel since it takes into account a good's property to facilitate 'better' matches. This initially triggers a 'bandwagon' effect in the demand for fashion when few people own the dress. The more high-type consumers buy it, the less likely are non-buyers to meet a high type, which increases the demand for the dress. This process continues along the upward-sloped part of the demand curve until all *high* types wear the dress, and not having the dress implies the certainty of being matched with a low type. Now Leibenstein's 'snob' effect sets in: any next purchase decreases one's probability of meeting high types. In the case of an elitist fashion cycle, once all the high types have bought the new design, the designer can set the price to zero and offer a new fashion innovation.

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[16]See Subsection 2.2 .

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Although Pesendorfer's model has been exposed repeatedly to critique,[17] it explains why fashion cycles may emerge based on social interaction and the desire "to interact with the 'right' people"[18], and when a designer-monopolist can set the price.

2.1 Fashion does not trickle

Despite the theoretical soundness of his approach, Pesendorfer's assumption of a supplier/designer empowered to 'create' and to control fashion cycles, needs some reconsideration. Pesendorfer argues that

> [n]ew designs are introduced first in the top line (Armani Via Borgo Nuovo) at a very high price and *later* are passed on to lower priced levels. Currently, for example, the new jacket design will only be offered by Armani Via Borgo Nuovo, while Emporio Armani still offers the jackets that were fashionable in previous years. Armani is therefore an illustration of fashion cycles very similar to the ones predicted in the model. Similar patterns can be found for many other fashion houses.[19]

Today, designers and fashion houses are no longer monopolists; and they cannot sell a new style first to the rich, later to the slightly less rich, and eventually to the poor. The proverbial "cerulean sweater"[20] may well end up after years in the clearance bins of department stores, but this has nothing to do with the *formation* of fashion across social strata. As Davis (1992) puts it,

> Trickle-down theory, along with other sociological theories of fashion [...] reveals itself as peculiarly incapable of informing us substantively of how clothing meanings are engendered, communicated, and eventually dissipated. Yet it is this, after all, that lies at the core of the fashion process.

The need for an understanding of what is fashionable affects all social classes simultaneously[21], through the manifold availability of styles in the mass market and the ability of individual self-expression that no longer follows upper-class emulation in the domain of dress. Styles are simultaneously available from many producers, which rules out intertemporal price discrimination as a means of fashion propagation. When Armani creates a new "look," this look can be bought virtually simultaneously by customers at any level and any

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[17]Coelho et al., 2004 and 2005, Pesendorfer 2004 and 2005.

[18]Pesendorfer (1995 p. 772).

[19]Pesendorfer (1995 p. 774).

[20]The Devil Wears Prada (Motion picture, 2006).

[21]Lowe and Lowe (1985) show in their study that "the pattern of class emulation has broken down since new fashions permeate the various strata of society almost simultaneously."

price. While fashionistas and celebrities may well wear a particular dress exclusively,[22] this no longer explains how fashion is typically initiated and selected.

So far fashion economics has done little to explain this process of fashion *formation*. While the problem of using fashion as a means of social distinction has been discussed in Stigler and Becker (1977), this issue is nevertheless difficult to tackle in a simple economic framework.[23] Stigler and Becker, following Blumer (1969), illustrate the need for "a subtle prediction of what will be approved novelty"[24] to permit a specific fashion to become accepted. As Entwistle (2000 p.222) illustrates, "[t]he fact that there is something mysterious about this 'incipient taste', but it is difficult to find its origins, does not mean that it is fictitious."[25]

Stigler and Becker do not explain the fashion process further, but restrict their explanation to a conformist argument, with income being the choice variable. Fashion goods, in Stigler and Becker, do not carry the kind of meaning discussed by Crane (2000). Thus, a household spends its income to buy fashion goods in order to maximize the utility it derives from the commodity 'social distinction'. If a second household now increases its own contributions for this commodity, the social environment changes, and in order to 'keep up with the Joneses,' the first household needs to keep pace for reasons of conformity.[26] While Pesendorfer's monopolist-designer contributes to an understanding of why it is profitable to introduce a new style at a particular point in time, Stigler and Becker do not answer the question of how fashion is initiated and formed.

2.2   Setting the Stage

This calls for a new concept, capable of explaining the institutionalized disclosure and selection processes that characterize fashion in postmodern societies. We argue that fashion wearers are only indirectly involved in the formation process of fashion. The "pivotal intermediaries"[27] between the realm of fashion designers and fashion consumers are the media. As we will show, there is a reason to separate the fashion process in its productive part from the visual narrative of fashion media. It lies in the fact that consumers typically cannot gain the same information about what is fashionable on their own. This is far from being a trivial observation, as we will emphasize below.

The power of fashion magazines in spreading fashion and propagating styles cannot be underestimated. In Bourdieu's (1984) words, it is the press that 'creates the creators.' As we argue, there is a division of labor between designers and fashion media. Media are the proclaimers of a new style, and fashion magazines are the best source of information about lifestyle and the spirit of the age in fashion. We read fashion magazines to learn more than

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[22]This illustrates the point of haute couture today: garment exclusively made-to-order for a particular person, individually priced. While we don't deny its existence, we relativize the importance of haute couture in today's fashion process compared to the role of media.

[23]Blumer's theory, as shown in Davis (1992) moreover lacks an explanation of the institutional details that characterize the fashion process in some way.

[24]Stigler and Becker (1977 p. 88).

[25]In a similar vein, Dichter already argues in 1985 that designers may *initiate* a style, while Sproles (1981) sees designers as fashion proposers.

[26]Stigler and Becker (1977 p. 88).

[27]Moeran (2006 p.727).

just a few facts about a particular market good. *Vogue*[28] for example, is not a magazine that ranks styles like appliances according to efficiency, power ratings, size and cost. Each fashion magazine has its particular clientele, and it both understands and reiterates the social values of its readers. It has the authority to tell those readers who share its view how the *zeitgeist* translates into ideological positions and can be expressed by wearing fashion. *Vogue* tells us which among many possible expressions are in fashion, and we share *Vogue*'s view of fashion. We no longer strive for social distinction per se,[29] but we see our own ideological position expressed in fashion through the information that *Vogue* provides. *Vogue*, like other magazines that cater to other consumer groups with different values, tells us when and why business women cannot ignore the actual display of globalization, immigration, or other global topics, and when they can and should. *Vogues*' chief editor takes care of us. Put simply, we consult our preferred fashion magazine because it saves us from being ridiculed, as well as from being old fashioned.

We show that the mechanism that *Vogue* and other magazines command is typically more informative for the reader than any other source of information to which a fashion interested consumer may have access. *Vogue* has the power to select a particular *zeitgeist* topic that has been simultaneously expressed by different designers. This corresponds to Entwistle's view that

> [e]ach individual designer and stylist wants to be seen to catch the mood of the time and, in doing so, taps into the same cultural trends. 'Fashion' is therefore the product of interactions between these cultural mediators and their sources of inspiration, as well as the result of the internal dynamics of fashion itself. It can be argued that of all these complex elements, closely interconnected as they clearly are, the most obvious is also the most important, namely the way in which a new, would-be fashion relates to the fashion that is in mode. That is to say, the new fashion seeks - inevitably - to extend, qualify, comment on or contradict the existing fashion.[30]

3 The model

To exercise this power to select a *zeitgeist* topic, and thus reward designers for their disclosure, is, as we argue, not only a particular feature of the fashion process, it is actually the main reason why we have fashion magazines. By observing information embedded in the disclosure of more than one designer, fashion media constrain the designers to deliver collectively a more accurate picture of the possible *zeitgeist* in fashion, compared to a setting

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[28]Following the motion picture "The Devil Wears Prada" we use *Vogue* ("Runway") as our leading example. This comes without loss of generality: we can virtually rank magazines according to the values of their readers.

[29]Stigler and Becker (1977).

[30]Entwistle (2000 p. 222/3).

in which only one designer is consulted. Whether fashion designers will be understood, approved, and ultimately "form" a new fashion together, depends on the communication and selection process in which designers and fashion magazines are involved. It is as if fashion magazines are empowered by their readers either to distill a new fashion when they see two designers agree, or to reject their expressions of the zeitgeist altogether. Our explanation furthermore avoids circular statements about novelty and zeitgeist that have overshadowed older theories, as Svendsen (2006) has articulated:

> The problem is that it is notoriously difficult to define accurately the 'spirit of the age', especially when fashions change as quickly as they have over the last few decades, and when a fashion cycle may be so brief that it hardly lasts a season. [...] One could possibly claim that today's 'spirit of the age' is an unrestricted pluralism with extremely fast changes, and that this is reflected in present-day fashion. The problem is that this would not explain why, despite everything, there is often a certain coincidence between various designers during a given season.

Svendsen illustrates what we model below: the certain coincidence between various designers permits a fashion magazine to gain more information out of the disclosure process in which they have an important stake.

Our cheap talk game expresses what Bourdieu (2000) has called the mediation of habitus expressed through clothing. To illustrate, we introduce a unidimensional space that permits us both to rank an exogenously determined *zeitgeist* topic, observed by the designers, as well as the preferred position of all players. We argue that a style expresses an ideological position along this axis, each topic occupying a number between 0 and 1. $\theta = 0$ marks the most conservative, and $\theta = 1$ the most avantgarde position. At any point in time, there are particular *zeitgeist* topics that can be ranked in this way, and there is agreement among fashion designers about this position. An example is given in Fig. 1.
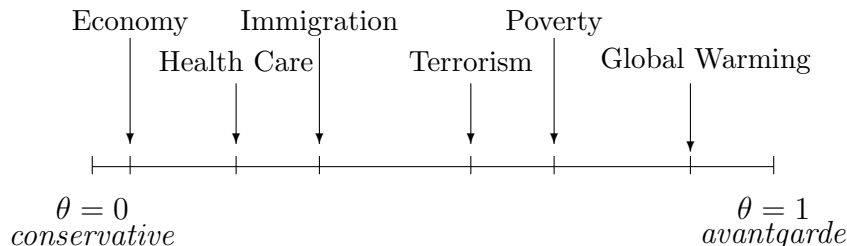

Fig. 1: Possible rankings of current *zeitgeist* topics along a unidimensional scale (adapted from CBS News Polls, Jan 1-3, 2007)

Our intuition of ranking different *zeitgeist* topics follows the literature on political expertise and voting.[31] The use of a unidimensional scale comes with little loss of generality. It not

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[31]See Austen-Smith (1993), Gilligan and Krehbiel (1989) and Epstein (1988).

only accounts for which *zeitgeist* topic individuals would be most enthusiastic about, but also for how they would rank different positions given their own social preferences.[32]

3.1   The two-player benchmark[33]

Before introducing our three-player disclosure model, we first provide an overview of the classic cheap talk model of Crawford and Sobel (1982, CS hereafter), who model two players, an informed sender, and an uninformed receiver (decision maker). Both players have a known preference position, which we normalize to zero for the receiver. The sender's position differs from zero and is a known number b along the state interval $[0, 1]$.

The logic behind the game is that the sender has private information about the exact position θ, while the receiver only knows that this variable is uniformly distributed on the state interval $[0, 1]$. Disclosing a message is costless, and there is no difference between sending a message conveying a lower or a higher zeitgeist state θ. Important for an understanding of the game is that the sender, by disclosing a particular message, typically reveals *some* information about the true zeitgeist, and the receiver after observing the message takes action y, which affects the utility of both.

The fashion game follows similar institutionalized processes of information disclosure that we observe in different institutions (legislatures, firms, agencies, markets), which share the property that a decision maker (here, a fashion editor) typically knows little or nothing about what the informed players (designers) whom she consults know, while the latter have their own agenda and aim at influencing the decision maker toward taking an action that they prefer.

In CS, both players have quadratic utility functions with a maximum, the receiver's utility being

$$U^R(y, \theta) = -(y - \theta)^2,$$ (1)

while the sender's payoff function is

$$U^S(y, \theta, b) = -(y - (\theta + b))^2.$$ (2)

Thus, the receiver, observing the state of nature *(zeitgeist)* being θ, will choose $y = \theta$ to reach her preferred outcome, while the sender would prefer the action $\theta + b$.

An interesting property is that for any $b > 0$, revealing exact information is never a best response for the sender. A sender observing θ and revealing it as such would make the

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[32]Empirical findings in the voting literature justify the use of metric spatial distances along a unidimensional scale based on observed choices. Poole and Rosenthal (1985) analyze the scaled positions of legislators in a roll call voting setting, and find that many aspects following an intrinsic multidimensionality permit to interpret such topics along a single dimension without loss of generality.

[33]The reader familiar with this literature may proceed to the next subsection.

receiver choose $y = \theta$ and according to (2) reach a payoff of $-b^2$. Instead, misreporting the state being $\theta - b$ would give him a payoff of zero.

Whether the receiver can gain some information from consulting the sender depends on how widely the two players' biases differ. For any bias of the sender of $b \geq \frac{1}{4}$ with the receiver's bias set to zero, the sender cannot convey any credible message. The only equilibrium is a 'babbling' equilibrium, and no information is conveyed. In other words, if a receiver disagrees too much with the sender's preferred point, she does not believe what the sender discloses.

We start with the meaningful example of sender biases in the range $\frac{1}{4} > b \geq \frac{1}{12}$. Within this range, the sender is able to communicate two possible messages, to be understood as a simple form of language. Note, however, that the meaning of this language differs with the biases. For $b = \frac{1}{12}$, both players know that, should the sender disclose a message understood by the receiver to intend the interval $[0, \frac{1}{3})$, this will trigger a decision by the receiver of $\frac{1}{6}$, which itself affects the sender's payoff. In turn, both know that if he sends a message understood as interval disclosure in $[\frac{1}{3}, 1]$, this implies that the sender will choose the action $\frac{2}{3}$.[34] Although nobody can verify the sender's observation of θ, he would harm himself by telling the receiver that the true state is in $[0, \frac{1}{3})$, when in reality it is in $[\frac{1}{3}, 1]$, and vice versa, since the receiver's action affects the utility of both players.

We illustrate this property in the graph below. It is important to understand that the sender knows that by sending one of the two messages, he will trigger either $\frac{1}{6}$, or $\frac{2}{3}$. The sender, observing the true state of nature to be, say, $\frac{1}{5}$ will never disclose the second message conveying this value to be in $[\frac{1}{3}, 1]$ since he could do strictly better by sending the first message, which conveys to the receiver that the state is indeed in the interval $[0, \frac{1}{3})$.
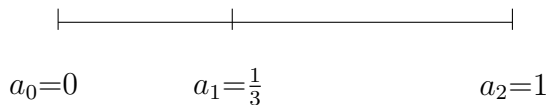
$$\vdash\!\!\!\rule[0.5ex]{6em}{0.4pt}\!\!\!\rule[0.5ex]{0.4pt}{1ex}\!\!\!\rule[0.5ex]{10em}{0.4pt}\!\!\!\dashv$$

$$a_0 = 0 \qquad\qquad a_1 = \tfrac{1}{3} \qquad\qquad\qquad a_2 = 1$$

Fig. 2: Partitions with $b = \frac{1}{12}$

A message disclosed by one sender is sufficiently well understood if it implies one of the two possible partitions along the state space, once both players know their biases (here 0 for the receiver and $b = \frac{1}{12}$ for the sender), as illustrated below in Fig. 3.

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[34] For a treatment see CS, as well as Krishna and Morgan (2005), and Osborne (2004 p. 347).

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$$m_1 \qquad m_2$$

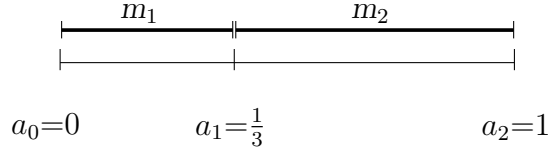$$a_0{=}0 \qquad a_1{=}\tfrac{1}{3} \qquad a_2{=}1$$

Fig. 3: Messages and partitions for $b{=}\tfrac{1}{12}$

If the messages disclosed by the sender are well understood and can identify the intended interval, there is mutual agreement between the players that, as long as the state of nature observed by the sender is below $\theta = \tfrac{1}{3}$, he can always indicate this by sending a message that will trigger an action of $y = \tfrac{1}{6}$. In turn, if the sender observes the true state to be above $\tfrac{1}{3}$, he will indicate this through disclosing a *different* message, telling the receiver precisely that the true state is in the other partition. For the exact value of $\tfrac{1}{3}$, a "break point" is generated where the sender is indifferent to the outcome of the two actions y_1 and y_2, as indicated by the two equidistant arrows starting from the sender's 45 degree "indifference curve" as illustrated in Fig. 3 below.[35] As usual in the literature, the state space (here, *zeitgeist*) is displayed along the x-axis, with the y-axis denoting the receiver's actions. The 45-degree line helps to check for the sender's indifference by finding the equidistance along this line to the two actions 'offered' by the receiver. The line has a y- intercept equal to the sender's bias.
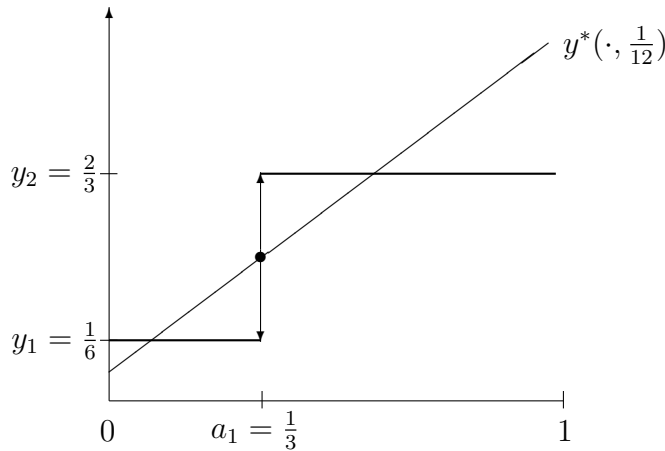

Fig. 4: States and actions with $b = \tfrac{1}{12}$

In the one-sender setting, the disclosure game shows the important property that decreasing a sender's bias b makes the sender a "better expert" in that the "informativeness" of the game increases. This can be measured by the expected utility that the receiver has ex ante when consulting a sender with a known bias, which permits us to apply simple comparative statics as shown in the appendix.

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[35]Here, the "no-arbitrage condition" of CS holds.

For a range of biases satisfying $\frac{1}{12} > b \geq \frac{1}{24}$, the informativeness increases further, with the CS game now leading to three-partition equilibria, and to four-partition equilibria when the sender's bias falls below $\frac{1}{24}$.

We assume in a next example that the receiver has a choice between picking a sender with a known bias of $b_1 = \frac{1}{40}$ and one with a bias of $b_2 = \frac{1}{12}$. From an ex-ante perspective, the receiver would always prefer to ask the former. Whatever zeitgeist variable will result, the "less biased" or "more loyal" sender with $b_1 = \frac{1}{40}$ can reveal to the decision maker in far more detail where the true zeitgeist state θ must lie along the state axis (Fig. 5):
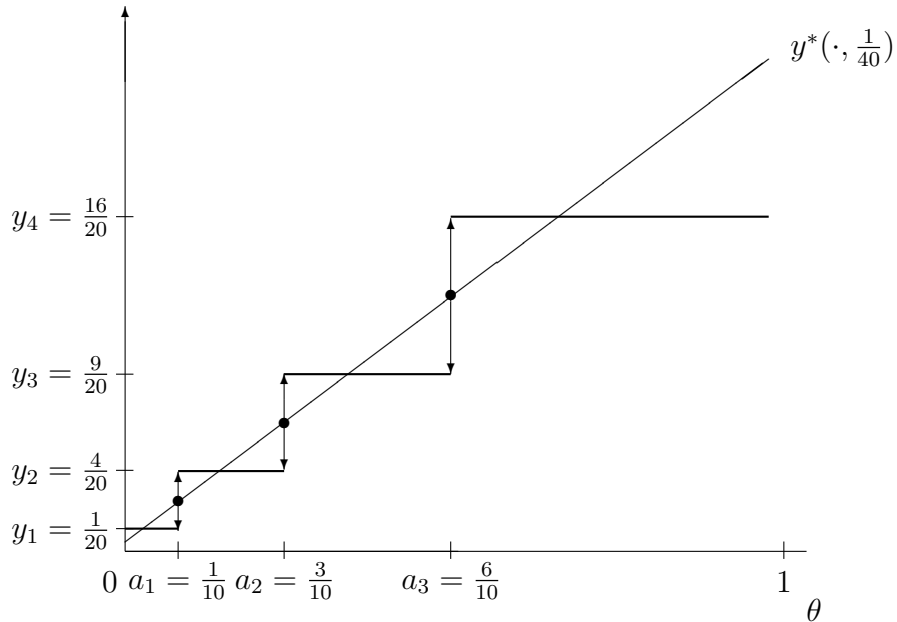

$Fig.$ 5: Equilibrium with one sender and $b = \frac{1}{40}$

This leads to our next observation about the meaning of language in one-sender costless disclosure games when the sender's bias decreases. Assume this disclosure game is a visual one, and the receiver knows the sender's bias of $b = \frac{1}{40}$ before the latter discloses. Then, the sender already knows that as long as they speak a common language in which each message implies one of four possible partitions (m_1 to m_4), there is no further ambiguity in the language. Since the precision of language is influenced by the sender's bias, picking a sender with a known bias of $b = \frac{1}{40}$ implies that the language and its necessary precision is determined for the receiver. No matter where the true state is located, the receiver knows already before the sender's disclosure that after the disclosure it will be in one of the following partitions (Fig. 6).
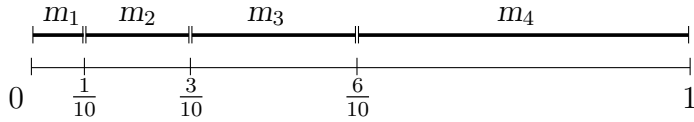
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Fig. 6: Messages and partitions for $b = \frac{1}{40}$

3.2 Understanding a visual language

Before proceeding to the two-sender case, we illustrate our findings with the following example. Assume that before a fashion event an editor visits a designer and attends a presentation of all the designer's collections. Intuitively, the designer may show her a first example, signifying the partition m_1, another that is commonly understood as implying m_2 etc. In light of the movie mentioned in the title of our essay, let us assume that the *Vogue* ("Runway") chief editor with $b = 0$ receives a personal fashion show at Valentino, a fashion czar whom she has known for many years and with whom she agrees in general (this is expressed by the relative close bias of $b = \frac{1}{40}$).

Valentino, during their private meeting, will be able to convey different meanings to the *Vogue* chief editor with his prepared pret-a-porter collections. For example, with one collection he will convey the message that the spirit of the age is expressed in a 2006 dress with modernist elements and some accessories that the chief editor, having known his work for years, understands as signifying the partition m_1, covering the zeitgeist topic, say 'Economy.' Should she disclose this style to her readership as fashionable it would be understood as such, given the understanding of zeitgeist rankings of all players involved.

When Valentino shows her a different collection, this time with global and ethnic elements understood as conveying m_2, she will believe that zeitgeist topics such as 'immigration' are on the agenda. Examples for m_3 could contain a Valentino dress with military applications, epaulettes etc., while for m_4, 'global warming,' Valentino might present simple fabrics and varying shades of green. Important for this example is that the two players agree on the visual language signifying particular intervals along the zeitgeist space, although neither yet knows what the next zeitgeist topic will be.

As is easy seen, this example also applies to more biased senders. Let us assume that a far more avantgardist designer (e.g. Galliano, known to the *Vogue* editor as having a bias of $b = \frac{1}{12}$) shows her his collections. In the light of what was shown before, we would expect that Galliano is able to convey one out of two distinct messages. Given his bias, the information structure between *Vogue* and Galliano is a coarser one.[36]

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[36]However, as is intuitive, a journalist closer to Galliano's position would extract more information from his collections about the zeitgeist.

3.3   Combining the messages of two designers

We now introduce our two-sender model that permits a more refined information structure. In the light of Svendsen (2006) and Entwistle (2000), we argue that the formation process of fashion entails two important but different tasks for the journalist:

· The journalist typically observes disclosures from more than one designer and seeks for a certain coincidence between designers. This is modeled through simultaneous disclosure and overlapping partitions that trigger the journalist's decision.

· The journalist has the decision power either to proclaim a new fashion, in the way fashion highlights aim at contradicting or confirming existing fashions. Therefore, our model has a dynamic component. We express this through permitting the journalist not to react to the designers' work, and to deny that their collections carry any meaning about the *zeitgeist*.[37] The feature of rejecting two contradicting messages comes with the introduction of a second sender, however this refinement concept has not yet been studied.

Our model offers a combination of a simple disclosure mechanism as in CS and a refinement that follows from observing two signals.[38] The time line, the equilibrium concept, and the comparative statics for the parametric example are given in the appendix. Essentially, our mechanism shows that the possible disclosure signal of two senders can be used to refine the decision maker's information about the state (*zeitgeist*), once her posterior beliefs (what she will believe about the state of nature while simultaneously observing two messages) are known by the two senders and she can commit to not taking an action (a fashion decision proclaiming a new 'style' or 'trend') when receiving contradicting messages. This property differs from the original CS game in which the receiver, having once picked a sender with a known bias, cannot refuse to accept the expertise of the sender she has agreed to consult.[39]

It is sufficient to know that the three players are informed about each other's biases and each sender knows that the receiver understands his message accurately to imply the intended partition, and that this understanding is mutual. Both senders observe the zeitgeist variable θ before sending a visual message simultaneously to the receiver during the fashion

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[37] *Vogue*'s January 2007 report on the new Spring fashion is an example for such rejection:

"But the fashion industry as a whole seems to be asking the wrong question. Was it time, in the breathy words of Justin Timberlake, to bring 'sexy' back? No. Do grown women, as much as they may have enjoyed Ken Burns's fine PBS documentary on Andy Warhol and the factory, actually want to look like Edie Sedgwick? No." *Vogue* January 2007 p. 137.

[38] The refinement that our two-sender mechanism uses is somewhat similar to the concept of 'rich language' refinements described in Blume (1996) and Olszewski (2006). However, it is not different information that becomes available at different times, but the simultaneity of disclosure of two messages that drives our result.

[39] Our model differs from other concepts in the literature. The equilibrium that we found is more informative than the sequential discloser equilibrium in Krishna and Morgan (2001), where the signal of one sender is observed by the other players before the second sender discloses.

Furthermore, our paper also differs from Li (2003) who like us assumes that both experts are perfectly informed, but limits the state space to two extreme states plus one of zero. In our model, the senders' biases can take any value between 0 and 1, so can the state variable θ. However, Li's option of the receiver to "do nothing" is similar to our idea of taking a default action whenever observing disjunct meaning intervals. For a detailed discussion see Gick (2006).

event (fashion week). Importantly, the two designers know what the decision maker will trigger once they know the state of nature and the receiver's posterior beliefs.

We illustrate this equilibrium profile for our two earlier bias examples of $b_1 = \frac{1}{40}$ and $b_2 = \frac{1}{12}$, assuming that the status quo of fashion (the previously nominated style by *Vogue*) is $\overline{y} = 0.3$. Fig. 7 below shows that in addition to the original partitions in the CS game that emerge under $b_1 = \frac{1}{40}$, there is a pooling region that always results when the zeitgeist value lies between $\frac{1}{6}$ and $\frac{3}{8}$.[40] Note that this is a refinement, rendering the disclosure process with two designers more informative, based on the known past decision of the receiver.
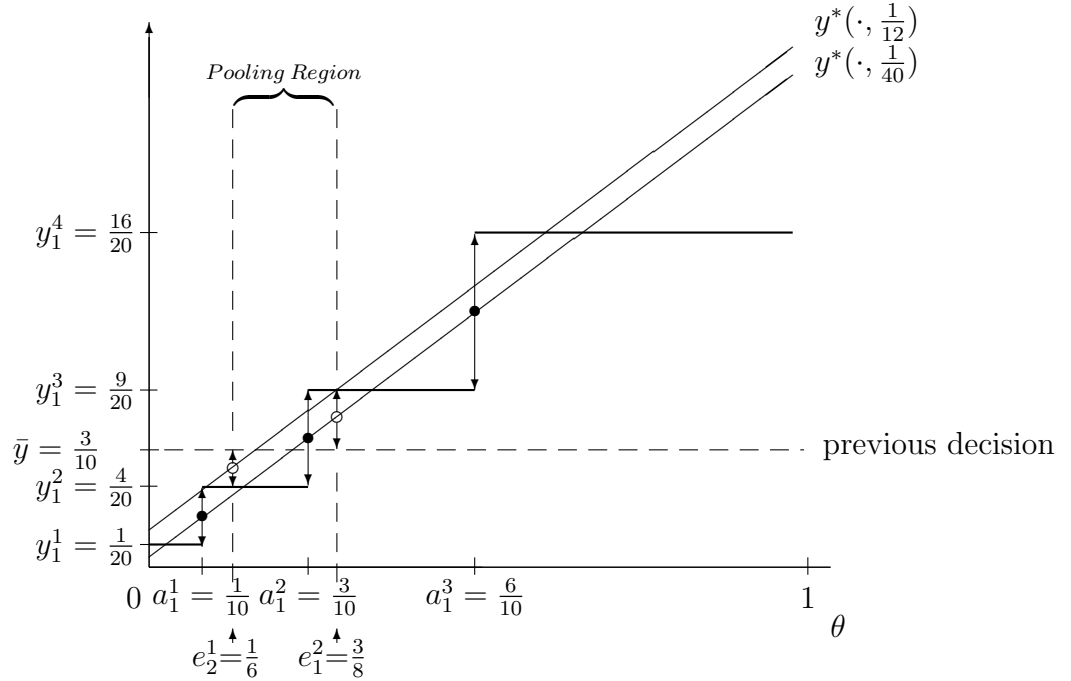

$Fig.$ 7: Equilibria with 2 senders under simultaneous disclosure with $b_1 = \frac{1}{40}, b_2 = \frac{1}{12}$

The new equilibrium concept leads to five instead of four partitions that correspond to meaningful intervals. Consulting two senders permits the receiver to narrow down more accurately the position of the state of nature: the partitions are now 0 to a_1^1, a_1^1 to e_2^1, e_2^1 to e_1^2, e_1^2 to a_1^3, and a_1^3 to 1.[41]

The equilibrium concept can be understood as follows. The receiver, before the senders observe the *zeitgeist* θ, discloses her willingness to take any disclosure of the less biased sender for granted, and to choose action y_1^* accordingly, as long as the simultaneously disclosed

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[40]To reduce unnecessary complexity, the disclosure intervals of sender 2 (same as in Fig. 2) are not illustrated in this example.

[41]Subscripts denote the players, superscript the intervals of each player.

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visual message of sender 2 made her understand that sender 2 confirms this message. Would the receiver understand the single partitions being disjunct, she would commit to leave $\overline{y}$ implemented.

To illustrate why this refines the information structure, assume that both designers observe a *zeitgeist* of say $\theta = 0.36$. Sender 1 then would prefer to tell that the true state is in his second interval, triggering a decision of y_1^2, while the second sender with the higher bias $b_2 = \frac{1}{12}$ is better off with the old decision $\overline{y} = 0.3$ and can rely on triggering this action through sending his alternative message y_2^2. The decision maker will observe the contradicting messages and decide to not proclaim a new fashion but to implement $\overline{y} = 0.3$. This refinement stemming from two designers who observe the same state renders the mechanism more informative than consulting the less biased sender only, as shown in the appendix.

Fig. 8 shows the partitions of both designers and possible actions derived from joint disclosure on the lowest line:
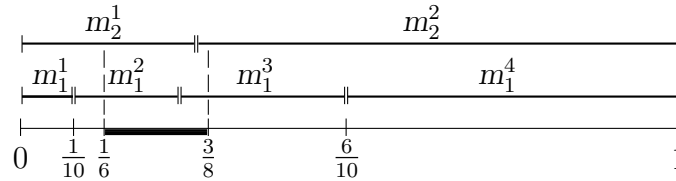

$Fig.$ 8: Combination of messages under simultaneous disclosure $(b_1 = \frac{1}{40}, b_2 = \frac{1}{12})$

A more formal explanation of the equilibrium concept is given below.[42]

Case 1. $\theta \in [0, a_1^1)$. Sending a message implying m_1^1 is optimal for sender 1, and the receiver takes action y_1^1 as long as sender 2 discloses m_2^1. None of the senders will deviate and trigger $\overline{y}$, each sender is better off triggering the equilibrium action y_1^1. As is easy to see in Fig. 7, the y^* values are closer to y_1^1.

Case 2. $\theta \in [a_1^1, e_2^1)$. Sender 1 optimally discloses a message leading to m_1^1. Sender 2 discloses m_2^1 and the receiver, following his posterior beliefs, takes action y_1^2. Neither sender is better off triggering $\overline{y}$.

Case 3. $\theta \in [e_2^1, e_1^2]$. At least one sender will deviate and trigger $\overline{y}$. We consider the following subcases:
• We first consider the subinterval $[e_2^1, a_1^2)$. Once θ has reached the value of $e_2^1 = \frac{1}{6}$, sender 2 will prefer to deviate and to imply m_2^1, which induces $\overline{y}$ together with the first sender's implied interval m_1^2. Sender 1 cannot do better than to accept pooling. No sender can do better. Sender 1 knows that 2 will send a message in m_2^1, and no other message of sender 1

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[42]For a formal treatment see the Appendix as well as Gick (2006).

can avoid pooling. A deviation would either not change the result or make sender 1 strictly worse off, given sender 2's equilibrium strategy.

• Subinterval $[a_1^2, a_2^1]$ is characterized by the fact that both senders are better off triggering $\overline{y}$ compared to any other action y offered by the receiver. Both senders are able to disclose meaningful messages that can be understood to belong to disjunct meaning intervals. The interval candidates m_1^1 together with m_2^2 will trigger $\overline{y}$.

• The last subinterval, namely $(a_2^1, e_2^2]$. Here sender 2 will imply m_2^2 while sender 1 will trigger $\overline{y}$ through choosing either the interval m_1^1 or m_1^2.

Case 4. $\theta \in (e_1^2, a_1^3]$.

In this interval, it remains a dominant strategy for sender 1 to disclose in the interval m_1^3 and for sender 2 to imply m_2^2, triggering action y_1^3. Any unilateral deviation would make the deviating sender worse off.

Case 5. $\theta \in (a_1^3, 1]$.

The rightmost interval is reached as follows. Sender 1 implies m_1^4 and sender 2 m_2^2, leading to y_1^4. This again can be verified in Fig. 7: y_1^4 makes both senders better off compared to $\overline{y}$.

Last, we show that the receiver is indeed better off when choosing a disclosure game with two senders compared to one. This is done in the following proposition.

Proposition 1 *Compared to choosing only the sender with the closer bias of $b_1 = \frac{1}{40}$, the receiver is better off choosing a disclosure game with both senders and $b_1 = \frac{1}{40}$ and $b_2 = \frac{1}{12}$.*

The proof is given in the appendix.

4   Conclusion

This paper has aimed at delivering new insight into the processes of fashion formation. The disclosure mechanism that we use to model the interaction between two designers and a fashion journalist is more informative than a game form in which only one designer discloses. Indeed, we argue that the mechanism proposed here nicely captures the essential properties of fashion processes between designers and fashion media. When comparing the fashion highlights of two different designers, fashion magazines do not just randomly pick some styles for arbitrary reasons. Fashion magazines have the power to extract more information out of jointly observed fashion messages. Our view supports concepts that have aimed at replacing 'trickle-down' theory. We find that the fashion selection mechanism, first laid out in the work of Blumer and later continued in the conceptualizations of Davis (1992), Miller et al. (1993), Entwistle (2000), Cholochatpinyo et al. (2002), Svendsen (2006) and Moeran (2006), is typically informationally superior to other disclosure games with biased players. Fashion media can pick winners and losers among designers, and this power provides a service to their readership that seeks information about what is fashionable. Put differently, the very powerful journalist is able to dictate fashion. The reader, choosing a fashion magazine close

or identical to her own social preferences, receives a service that includes more information than she would have been able to gather on her own, or by just simply going shopping. Since the designers know what *Vogue* will decide following its known posterior beliefs, our disclosure mechanism forces the designers to deliver jointly a more detailed picture of fashion.

Our findings that fashion media render the information aggregation process more efficient for their readers is theoretically robust[43] and can be extended to cover a series of related questions. We have assumed that the preferences between the fashion magazine and its clientele are perfectly aligned, but the results also hold if we vary the reader's bias and introduce uncertainty regarding the designers' positions. The next case worth discussing would be a situation in which the reader/consumer and the designer prefer exactly the same point along the state space. Intuitively, the game would reduce to one between the designer and the buyer, with perfect information revelation. With the broader picture in mind, we have focused on the main issues that characterize the relation between designers and media. As Pesendorfer (2004) has pointed out, the role of models in economics is to isolate the key aspects of the relevant reality.

The goal of our paper was to model the disclosure process between designers and media. This information influences buyers in their decision to purchase a specific article of clothing. Needless to say that individuals differ in income, in expenditure on clothing relative to other goods, in their preferences for cheap or high quality garments, and in other individual factors that play a role when linking information to actual demand.

That the 'Devil' wears Prada is of interest for the readers of this very magazine. It means that Prada and the chief editor share many of their views about the fashion world, thus their preferences are similar. Broadly speaking, consulting a designer like Prada will give the chief editor a relatively detailed picture about current fashion.

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[43]Gick (2006) has shown that the mechanism holds for a wide range of bias combinations among the three players. For reasons of completenes it should be mentioned that some nonmonotonic cases with more than one pooling region emerge, should the bias differences between the two senders be particularly pronounced. Other borderline cases with an extremely large pooling region may be informationally inferior as well. However, the discussion shows that such extreme bias combinations are not very realistic.

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6   Appendix

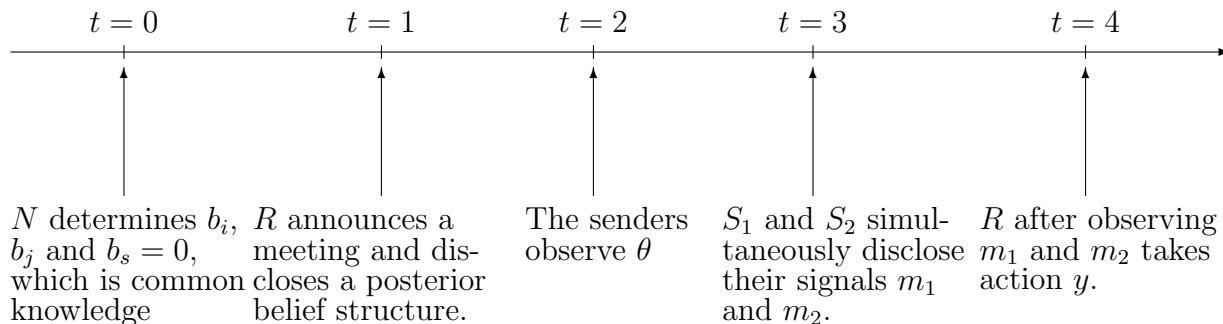**Timing of the game:**

Fig. 4: Timing of the game

Equilibrium: Definition.

A Perfect Bayesian Equilibrium (PBE) with one receiver and two senders S_1 and S_2 consists of

(i) *the pure strategy of the receiver as a function $y(m_1, m_2)$, mapping meaning intervals m_1 and m_2 into actions,*

(ii) *of the pure strategies of sender S_1 and S_2 as a function $\mu(\theta, b_1, b_2)$, mapping states into meaning intervals, depending on the own and the opponent sender's bias b_1 and $b_{2,}$*

(iii) *and of the c.d.f. $P(\cdot \mid m_1, m_2)$ specifying the posterior beliefs of the receiver such that:*

(1) *For all m_i, $m_j \in [0, 1]^2$, $y(m_1, m_2) = \underset{m_1, m_2}{\arg\max} \, EU^R(y | P(\cdot | m_1, m_2))$,*

(2) *Given $y(m_1, m_2)$, for all meaning intervals m_1 and m_2,*

$$m_{1,2}(\theta, b_1, b_2) = \underset{y}{\arg\max} \, E[U^S_{1,2}(y | \theta, b_1, b_2)].$$

(3) *The receiver's beliefs $P(\cdot \mid m_1, m_2)$ are derived from senders' strategies (m_1, m_2) using Bayes' rule whenever possible. This requires in particular that the two meaning intervals m_1 and m_2 are not disjunct.*

Parametric example. For $b_1 = \frac{1}{40}$ and $b_2 = \frac{1}{12}$ there exists a hybrid equilibrium with the following strategies and belief structures:

· Sender 1's strategy:

$$\mu_1(\theta, b_1, b_2) = \begin{cases} m_1 \in [0, a_1^1] \text{ if } \theta \in [0, a_1^1] \text{ and } U_1^S(y_1^*(\theta)) \geq U_1^S(\bar{y}), \\ m_1 \in (a_1^1, a_1^2] \text{ if } \theta \in (a_1^1, a_1^2] \text{ and } U_1^S(y_1^*(\theta)) \geq U_1^S(\bar{y}), \\ \quad m_1 \notin (a_1^1, a_1^2] \text{ else,} \\ m_1 \in [a_1^2, a_1^3] \text{ if } \theta \in [a_1^2, a_1^3] \text{ and } U_1^S(y_1^*(\theta)) \geq U_1^S(\bar{y}), \\ \quad m_1 \notin [a_1^2, a_1^3] \text{ else,} \\ m_1 \in [a_1^3, 1] \text{ if } \theta \in [a_1^3, 1]. \end{cases} \tag{3}$$

· Sender 2's strategy:

$$\mu_2(\theta, b_1, b_2) = \begin{cases} m_2 \in [0, a_2^1] \text{ if } \theta \in [0, a_2^1] \text{ and } U_2^S(y_2^*(\theta)) \geq U_2^S(\bar{y}), \\ \quad m_2 \in (a_2^1, 1] \text{ else,} \\ m_2 \in (a_2^1, 1] \text{ if } \theta \in (a_2^1, 1] \text{ and } U_2^S(y_2^*(\theta)) \geq U_2^S(\bar{y}), \\ \quad m_2 \in [0, a_2^1] \text{ else.} \end{cases} \tag{4}$$

· The receiver's posterior beliefs are

$$P(\cdot \mid m_1, m_2) = \begin{cases} \theta \in [0, \text{a}_1^1] \text{ if } m_1 \in [0, a_1^1] \text{ and } m_2 \in [0, a_2^1] \\ \theta \in [a_1^1, a_1^2] \text{ if } m_1 \in (a_1^1, a_1^2] \text{ and } m_2 \in [0, a_2^1] \\ \theta \in [a_2^1, a_1^3] \text{ if } m_1 \in (a_1^2, a_1^3] \text{ and } m_2 \in [a_2^1, 1] \\ \theta \in [a_1^3, a_1^4] \text{ if } m_1 \in (a_1^3, a_1^4] \text{ and } m_2 \in [a_2^1, 1]. \end{cases} \tag{5}$$

Whenever the meaning intervals are not overlapping, the receiver takes the default action $\bar{y}$, which is known to all players.

· Receiver's strategy:

$$y(m_1, m_2) = \begin{cases} y_1^1 \text{ if } m_1 \in [0, a_1^1] \text{ and } m_2 \in [0, a_2^1] \\ y_1^2 \text{ if } m_1 \in (a_1^1, a_1^2] \text{ and } m_2 \in [0, a_2^1] \\ y_1^3 \text{ if } m_1 \in (a_1^2, a_1^3] \text{ and } m_2 \in [a_2^1, 1] \\ y_1^4 \text{ if } m_1 \in (a_1^3, a_1^4] \text{ and } m_2 \in [a_2^1, 1] \\ \bar{y} \text{ else.} \end{cases} \tag{6}$$

Proof of Proposition 1.

The receiver's expected utility when consulting both senders is

$$EU^R = - \left[\int_0^{a_1^1} \left(\frac{a_1^1}{2} \right)^2 + \int_{a_1^1}^{e_2^1} \left(\frac{e_2^1 - a_1^1}{2} \right)^2 + \int_{e_2^1}^{e_1^2} \left(\frac{e_1^2 - e_2^1}{2} \right)^2 + \int_{e_1^2}^{a_1^3} \left(\frac{a_1^3 - e_1^2}{2} \right)^2 + \int_{a_1^3}^{1} \left(\frac{1 - a_1^3}{2} \right)^2 \right] = -0.00714.$$

Her expected utility in the CS equilibrium with $b_1 = \frac{1}{40}$ is

$$EU^R = - \left[\int_0^{a_1^1} \left(\frac{a_1^1}{2} \right)^2 + \int_{a_1^1}^{a_1^2} \left(\frac{a_1^2 - a_1^1}{2} \right)^2 + \int_{a_1^2}^{a_1^3} \left(\frac{a_1^3 - a_1^2}{2} \right)^2 + \int_{a_1^3}^{1} \left(\frac{1 - a_1^3}{2} \right)^2 \right] = -0.008\overline{3}.$$

Comparing the two results completes the proof. ∎